TECHNOLOGY DEPT.

McGRAW-HILL PUBLICATION

FACTORY

MANAGEMENT AND MAINTENANCE

FEBRUARY 1951

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WHAT MAKES AMERICA'S INDUSTRY STRONG ..... PAGE 80

CASE STUDY IN **HOW TO SET UP A CIVIL DEFENSE PLAN FOR YOUR PLANT** ... PAGE 86

11 OTHER ARTICLES
ON HOW TO RUN YOUR PLANT WELL IN THIS CRITICAL PERIOD
COMPLETE CONTENTS, PAGE 2

PERMANENTLY FORTIFIED
for Life-Time Wiring Protection

Unlike ordinary rigid steel conduit, SHERARDUCT is fortified—*permanently fortified*—against rust and corrosion by the Sherardizing Process of dry galvanizing. A pure zinc coating, driven into the pores of the steel, becomes an integral part of the tube itself because it's *alloyed with the steel*. Furthermore, SHERARDUCT will not split or peel, and although it can be bent easily, it will not crack!

SHERARDUCT is still further protected against acids and other corrosive agents by the clear "Shera-Seal-on" coating, baked on for added endurance. The smooth inside surface makes fishing easy.

Specify SHERARDUCT—full weight, threaded, rigid steel conduit—*fortified* to give wiring *life-time protection*.

Sold through leading electrical wholesalers.
Listed by Underwriters' Laboratories, Inc.

National Electric
PRODUCTS CORPORATION

1347 CHAMBER OF COMMERCE BUILDING, PITTSBURGH 19, PA.

RESEARCH KEEPS **B.F.Goodrich** FIRST IN RUBBER

Tons of razor-sharp steel poured on rubber

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FEB 20 1951
DETROIT

A typical example of B. F. Goodrich product improvement

EVERY HOUR, 24 hours a day, 15 tons of those razor-sharp slivers of steel (scrap from making tin cans) are handled in this plant, and the slivers are drenched with caustic chemicals. Four men used to pitch-fork the scrap into a baler. That was dangerous and expensive.

How about a conveyor belt? Any ordinary belt would be cut by the sharp steel and the caustic would eat through the fabric belt body, and weaken it.

Then B. F. Goodrich men suggested a B. F. Goodrich *cord belt.* The rubber is so tough it can stand the cuts and scratches of thousands of sharp edges. The reinforcement is made of separate cords, each cord entirely surrounded by rubber. Most plies have no cross strands at all. So if a sharp point goes clear through the cover the caustic reaches only *one cord.*

Engineers estimated that an ordinary belt would have gone to pieces in a few months. The B. F. Goodrich cord belt is still at work after 11 years. Cost of handling the scrap has been cut 50%!

Product improvement is a policy and constant program at B. F. Goodrich. If you use belting, hose or other industrial rubber goods, don't decide any product you may buy is the best to be had without first seeing your BFG distributor and finding out what B. F. Goodrich may have done recently to improve it. *The B. F. Goodrich Company, Industrial & General Products Division, Akron, Ohio.*

B.F. Goodrich
RUBBER FOR INDUSTRY

BEHIND THE BYLINE

DR. MAX D. KOSSORIS speaks with double-barreled authority about working hours and output. He has studied the subject exhaustively, as an economist and researcher, and has also been a worker.

He earned an impressive string of academic titles in economics and law at the University of Wisconsin. He earned his working laurels in manual work in factory and shop.

After some years in private industry as an industrial engineer, Kossoris became a government careerist by force of circumstance—the depression. His job in a large pulp and paper company folded about the time the Blue Eagle of the NRA flapped its wings. From NRA he went to the U. S. Department of Labor's Bureau of Labor Statistics, whose regional office in San Francisco he now heads.

Before he became director of the BLS regional office, Kossoris headed a BLS task force that conducted a comprehensive study of the effect of working time on productive efficiency of the worker. The results were published by the bureau in 1947 under the title, "Hours of Work and Output" (Bulletin 917, U.S. Govt. Printing Office, 35¢).

FACTORY invited Kossoris to review his studies in hope that discussion would point out some guideposts to plant managers faced now or soon with the need for higher production. In the electronically recorded interview on page 68 Kossoris touches on many aspects of the problem: How long can you work a worker before you run into the law of diminishing returns? Is there any ideal work week? How about Sunday work?

NORMAN J. GOULD, president of Goulds Pumps, Inc., says, "Goulds has become the world's largest manufacturer of pumps because it has refused to grow old, because we have continually looked forward. We have never lost the pioneering spirit, the willingness to experiment, the ingenuity to invent, nor the ability to participate."

That's the kind of reasoning that recently led Gould to visit Sylvania Electric's near-by television tube plant in Seneca Falls, N.Y. He had heard that the TV plant was doing a good job of increasing productivity. He went there to see for himself. You can, too. FACTORY's camera followed Gould and his host through the plant (page 112).

Gould's host is **H. W. ZIMMER,** Sylvania's executive vice president, and author of a maintenance article in last month's FACTORY. You'll find some facts about him on page 2 of the January issue.

Gould is the fourth member of his family to head the pump company. He took the reins from his father in 1908. Before that, he "learned the business" by working in various departments of the shop and then in the cost department until 1902. For the next two years he traveled all over the U.S. as a member of the sales force. In 1904 he took over the Boston office, became secretary of the company in 1905.

FACTORY

MANAGEMENT and MAINTENANCE

The Magazine of Plant Management for 59 Years

FEBRUARY, 1951

SPECIAL REPORTS

The Facts About Hours of Work *vs.* Output ..... BY MAX D. KOSSORIS 68

Which is better? Five 10-hour or six 8-hour days? This and other questions answered in a timely analysis of what happens when you work longer hours.

What Makes America's Industry Strong ..... BY HARRY LEE WADDELL 80

Never has it been so important to know how we got where we are today—and how we can go on to even higher highs in national output.

Case Study in Civil Defense 86

Basic steps for you to take to protect personnel and property in your plant from air attack. Photo sequence of a model disaster plan in action.

PRODUCTION

Getting Our Supplies on Pallets Saves Labor, Materials, Space ..... BY W. C. FOLEY 74

How Philip Morris got together with its suppliers on a program that has increased size of unit loads as much as 50 times—with mutual benefits.

Cases in Methods Improvement: The DeVilbiss Company 100

Cut costs but not quality, is slogan of DeVilbiss methods men. Selected examples shows how they apply principles of methods improvement.

CAMERA TOUR: Sylvania Electric Products Inc. How Better Methods Bring Greater Output per Man-Hour 112

Pump manufacturer visits TV tube plant—not to learn how to make tubes.

Directory of Mobilization Agencies 238

To help you know your Washington alphabet.

MAINTENANCE

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Exide uses them in planning new construction. Says they save money at the job, cut time needed to interpret blueprints, minimize errors.

My Best Maintenance Idea—and How I Put It to Work ..... BY W. MCK. SCOTT, JR. 97

The blue ribbon entry in FACTORY's Maintenance Idea Contest—and the names of other winners, as announced at the Plant Maintenance Show.

On page 77 **JOHN C. MANSFIELD** writes about his favorite subject—plant protection. He's well qualified to do so. He has served with various Westinghouse plant protection groups since 1937, is now captain of police for Sturtevant Division in Boston. Mansfield is a graduate of the Army's Military Security School for industrial plant guard officers, held at Fort Meade during World War II. He also knows something about disaster control. As borough clerk of Braddock, Pa. (1932-1937), he was in charge of the Flood Disaster Committee in 1934.

T. F. KEATING, engineer at De Laval Steam Turbine Company, says, "Last Spring we discovered that some pump users weren't getting the most out of their pumping units. We found that they were not using the system-head curve properly." So Keating wrote an article for FACTORY (page 118) to remedy the situation. A graduate of Yale (B.E. in mechanical engineering, 1945), he worked with General Electric from 1946-1949, then came to De Laval. His present job is to select centrifugal pumps to fit the specified conditions of each customer.

Today's Electric Heating Equipment ..... BY GEORGE A. VAN BRUNT 104
Seventh in a series: Latest Developments in Electrical Equipment.

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Compare your own painting program. Does it stack up?

Pick Your Pump With System-Head Curves ..... BY THOMAS F. KEATING 118
Never heard of system-head curves? Then this article was written just for you. Here's real help toward the solution of your pumping problems.

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Get Good Results With Handicapped Workers ..... BY M. J. MURPHY 94
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Which Safety Poster? ..... BY ALBERT A. CANFIELD 204
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1950 INDEX . . . READY MARCH 1

A complete guide to FACTORY's editorial contents. Write the Editor today for your free copy. Make it the start of a reference file of FACTORY indexes.
(*A few copies of 1947, 1948, 1949 indexes are still available. First come, first served*)

WILLIAM C. FOLEY joined Philip Morris 32 years ago. For 28 of those years he concentrated on sales promotion and advertising. He became vice president in 1933, member of the board in 1947. Since 1947, he has directed the company's purchasing, warehousing, and transportation efforts. His leadership has caused a big increase in efficiency of materials handling, faster turnover, decreased investment in inventory, and shorter delivery times to customers. On page 74 Foley tells about one of the improvements made in materials handling: palletizing incoming supplies.

Take a look at the man who won first prize in FACTORY's maintenance contest. He's **W. McK. SCOTT, JR.,** plant engineer and purchasing agent at Cold Spring Bleachery, Yardley, Pa. Scott has a B.S. in industrial engineering (Penn State, 1936) and an electrical engineering diploma (Drexel Institute Evening School, 1938). He was an engineer with Philadelphia Electric Company from 1936 to 1945, then came to Cold Spring Bleachery as plant engineer You'll find his prize-winning article and a list of other winners in the FACTORY contest on page 97.

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This H & D corrugated display box makes barbeques extra fattening—for sales figures!

The customer is "just looking for a fork to roast hot dogs"—until she spies this gay yellow and black display, with its clever Hamburgrill and its Cube Steak Broiler. Then her picnic menu suddenly expands beyond "just wieners"—and sales figures expand beyond "just forks for roasting hot dogs."

H & D package action can increase profits on *your* products, too, by such grouping of related items for tie-in sales, or by giving better display . . . providing secure protection . . . increasing multiple sales. Write for H & D's 11-volume "Little Packaging Library." Hinde & Dauch, 5101 Decatur St., Sandusky, Ohio.

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FACTORIES IN: Baltimore • Buffalo • Chicago • Cleveland Detroit • Gloucester, N. J. • Hoboken, N. J. • Kansas City, Kan. Lenoir, N. C. • Richmond, Va. • Sandusky, Ohio St. Louis • Watertown, Mass. *Offices in principal cities.*

G-E TUBES *FAST* FOR H-F HEATING

You get them as soon as you need them . . . right at your door!

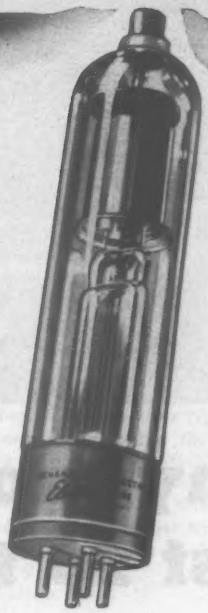
- **G. E.'s complete line includes the right types for sockets in your factory.**
- **Your G-E tube distributor makes same-day (often same-hour) deliveries from local stocks.**

DELAY is expensive when you need a new tube for an electronic heater. Waiting for a tube replacement means fewer products brazed, welded, or heat-treated; that much more idle time of the operator to be charged away.

The right tube . . . quickly . . . will chase away the shutdown phantom who feeds on profits. Here General Electric's full line of types for h-f heating comes to your aid. In the 15 G-E power tubes for heating—the 7 rectifier types—will be found the exact tube you need to restore heater operation.

And you get G-E replacements fast! Near you is a G-E tube distributor who carries in stock the types you need. He's waiting for your emergency phone-call . . . is ready to make delivery as rapidly as four wheels and gasoline can reach your door.

Check your G-E distributor's phone number now, to have it available when you need the fast, competent tube service he offers! The types he sells are new, operable, fully covered by G-E warranty. They're your best tube investment, as well as your best protection against delays from heater shutdowns. *Electronics Department, General Electric Company, Schenectady 5, New York.*



(At Top)

GL-889R-A
Power Triode

One of 15 G-E oscillator types expressly suited to h-f heating. These range in output from 55 w up to 100 kw.

(At Bottom)

GL-673
Rectifier Tube

One of 7 G-E rectifier types for h-f-heating power conversion. .25 amp average current capacity up to 10 amp.

You can put your confidence in—

GENERAL ELECTRIC

160-KA1

RESEARCH KEEPS **B.F.Goodrich** FIRST IN RUBBER

Why grommet V belts last 20 to 50% longer

THESE B. F. Goodrich grommet V belts have been running constantly for two years without losing a single minute due to belt trouble. Why?

Twin grommets eliminate causes of belt failures — The B. F. Goodrich grommet is made by winding heavy cord on itself to form an endless loop. There are two of these grommets, placed close to the driving faces of the belt. They make up the load-carrying section. No fabric plies to stiffen and build up heat. Because most belt failures occur where cords overlap, this *endless* cord section eliminates the cause of belt failures.

Grommets work all the time — In an ordinary belt much of the cord strength is lost, wasted in the center of the belt where the cords don't pull their share of the load. But in the grommet belt, there are no center cords to loaf. The grommets do the work, stay at it all the time.

Grommet V belts last longer — Laboratory and field tests show grommet V belts last 20 to 50% longer. The twin grommet construction (U. S. Patent No. 2,233,294) is a result of the constant research going on at B. F. Goodrich. No other V belt is a grommet V belt. Now available in C, D and E sections.

A special demonstrator "X-ray" belt has been made to show the grommet construction. Ask your local BFG distributor to bring it around. *The B. F. Goodrich Company, Industrial and General Products Division, Akron, O.*

Grommet V Belts BY
B.F.Goodrich
RUBBER FOR INDUSTRY

The remarkable BAKER newly designed 100% FUNCTIONAL FORK TRUCK is now available for

- SIT-DOWN DRIVE!
- STAND-UP DRIVE!
- CAPACITIES OF 3000 TO 6000 POUNDS!

A year ago we introduced the new BAKER Type FT Fork Truck in 3000 and 4000 pound capacities. Because of its highly advanced, completely functional design, this truck more than lived up to our claim that it would do *more work per dollar invested than any other truck in its class.*

The unprecedented acceptance of this truck and the insistent demand from our customers for other types and sizes, have resulted in our expansion of the line to include *capacities up to 6000 pounds* in both *stand-up* and *sit-down-drive.*

These new models incorporate all the features of the original 100% "Functional" FT Truck:

- ***Dynamic-braking, 5-speed, drum-type NoPlug controller.***
- ***Baker-built motors,* developing the highest horsepower for any motors their size and weight.**
- ***Exclusive Baker worm-drive transmission.***
- ***Soft-touch, direct action brakes* with dead-man control.**
- ***Baker patented wide-angle steering axle.***
- ***Rugged all-welded steel plate truck frame* with integral bumper counterweight.**

—to mention only a few.

Completely descriptive bulletins available. Ask for:
Bulletin 1324 for the FT (sit-down drive) 3000 to 4000 pounds.
Bulletin 1325 for the FT (sit-down drive) 6000 pounds.
Bulletin 1326 for the FC (stand-up drive) 3000 to 6000 pounds.

BAKER INDUSTRIAL TRUCK DIVISION *of The Baker Raulang Company*
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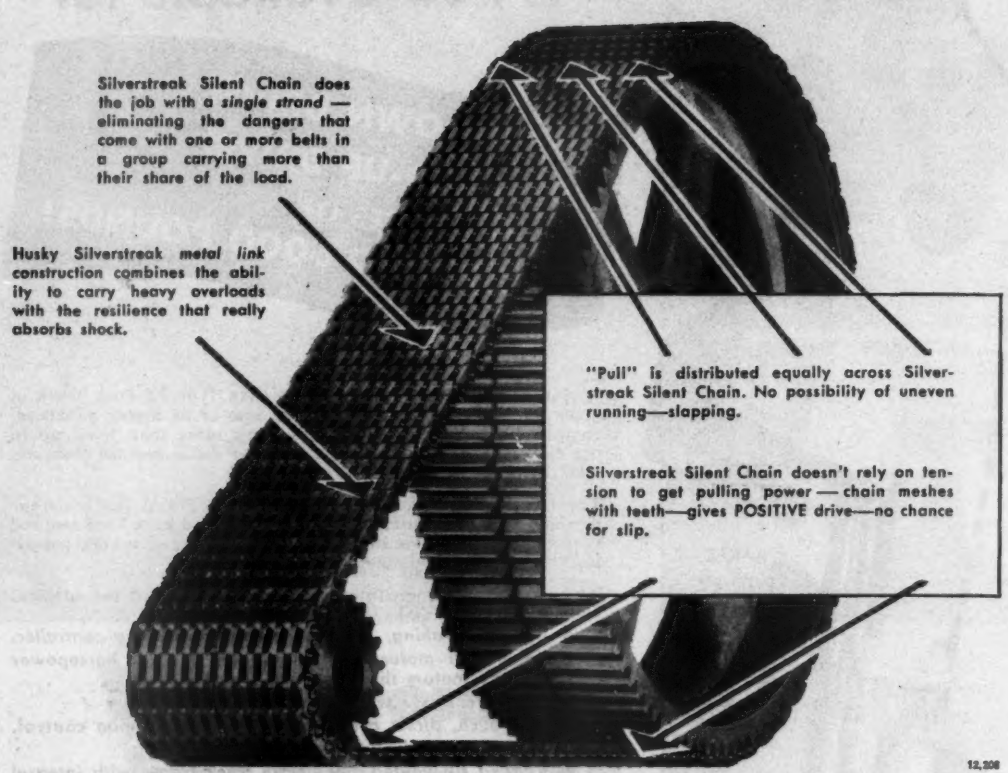
Baker INDUSTRIAL TRUCKS

SLIP-PROOF
SLAP-PROOF
SHOCK-PROOF


Silverstreak Silent Chain does the job with a *single strand* — eliminating the dangers that come with one or more belts in a group carrying more than their share of the load.
Husky Silverstreak *metal link* construction combines the ability to carry heavy overloads with the resilience that really absorbs shock.
"Pull" is distributed equally across Silverstreak Silent Chain. No possibility of uneven running—slapping.
Silverstreak Silent Chain doesn't rely on tension to get pulling power — chain meshes with teeth—gives POSITIVE drive—no chance for slip.
12,208

Get Full RPM Transmission With LINK-BELT Silverstreak Silent Chain Drives

Yes, get the amazing, trouble-free efficiency of 98.2%. A standard of operation that continues throughout the long, long life of the drive. More than this — every rating and design is backed by a record of *proven performance*. And every chain is engineered for the job. You conserve space, too — for Link-Belt Silverstreak Silent Chain Drives operate efficiently on short centers. Ratios as high as 10 to 1 are commonly used.

Little wonder, then, that so many concerns to whom top operation efficiency and rugged dependability are a must, standardize with Link-Belt Silverstreak Silent Chain Drives.

LINK-BELT COMPANY, Chicago 9, Indianapolis 6, Philadelphia 40, Atlanta, Houston 1, Minneapolis 5, San Francisco 24, Los Angeles 33, Seattle 4, Toronto 8, Johannesburg. Offices in principal cities.

LINK-BELT

SILVERSTREAK SILENT CHAIN DRIVES

30,000 Operations *EVERY* Month

"THIS TYPE 256 CONTACTOR operates under full load approximately 30,000 times per month. We have yet to find another contactor that will stand up under this service!" says J. A. Logan, president of Magnethermic Corporation, manufacturers of low frequency induction heating equipment.

"This contactor is now standard equipment on all of our 2300 and 4000 volt furnaces. All other high voltage contactors that we originally installed on our furnaces have been replaced by the Allis-Chalmers Type 256 Air Contactor."

Opening and closing the primary of an induction furnace at full load once every minute may be different than your control problem. But think of the years of trouble-free service a contactor capable of this duty will give you on normal motor starting applications!

What makes performance like this possible? Double break contacts and straight line vertical action are combined in Type 256 Air Contactors to eliminate maintenance factors such as flexible contact leads, turning shafts and shaft bearings.

Magnethermic Corporation's experience is typical . . . indicates the service you too can expect from Type 256 Air Contactors. These contactors are clean, easy to inspect, accessible, and compact. Call your Allis-Chalmers representative, or write for bulletin 14B7303 Allis-Chalmers Mfg. Co., Milwaukee 1, Wisconsin.

ALLIS-CHALMERS

What's good grooming for a golf shaft?

...a brush!

Prior to plating, golf shafts must be perfectly clean, free of heat-treat discoloration and surface imperfections. In cleaning and finishing, the problem was to get into the corners of the tapered True Temper "step-down" and to do the job in one pass at high speed.

The problem was solved with a five-station, in-line automatic machine equipped with Osborn Fascut® Brushes. This automatic brushing gives the shafts a smooth, uniform finish over the entire surface . . . and it has increased output 20% over the former method.

Perhaps new Osborn brushes and brushing techniques can improve *your* products and step up your productivity. An **O**sborn **B**rushing **A**nalyst will gladly survey your operations. Write today for an **OBA!** *The Osborn Manufacturing Company, Dept. 388, 5401 Hamilton Ave., Cleveland 14, Ohio.*

OSBORN

LOOK FOR THE NAME OSBORN . . . RECOGNIZED EVERYWHERE FOR QUALITY WORKMANSHIP AND MATERIALS

Osborn Brushes step up finishing output 20%

The problem here was to remove heat-treat discoloration and surface imperfections from golf shafts prior to plating. Due to the tapered True Temper "step-down" design of the shaft, it was difficult to get into the "step-down" corners with the former method. Two or three passes were required for thorough cleaning.

Now, with the five-station machine shown above, Osborn Fascut® Brushes, with compound, finish the shafts in one pass, netting a 20% increase in output. Uniform quality of finish over the entire surface is duplicated accurately from piece to piece due to the ability of the Fascut Brushes to blend with the exact contour of the golf shaft.

Brushes run at 900 rpm. Output of the machine is 1500 shafts per 8 hours or about 10 feet of shaft per minute.

If your production problem involves finishing or cleaning of parts, an **O**sborn **B**rushing **A**nalysis most likely will demonstrate how this work can be done more efficiently . . . at less cost with new, improved power brushing techniques. Call or write Osborn for this service. There is no obligation.

Make Containers Count

(and everything else, too)

with

VEEDER-ROOT COUNTERS

Containers . . . coin machines . . . compressors . . . corn-husking machines . . . (or what have *you?*) . . . all these and scores more count to the greater advantage of their users or producers, or *both* . . . with Veeder-Root Counters. These infinitely useful devices, electrical or mechanical . . . may be either applied to a process or *built into a product* as original equipment. WRITE: Veeder-Root Inc., Hartford 2, Conn. (New Phone: 7-7201). *In Canada:* Veeder-Root of Canada, Ltd., 955 St. James St., Montreal 3. *In Great Britain:* Veeder-Root Ltd., Kilspindie Rd., Dundee, Scotland.

"VEEDER-ROOT COUNTS EVERYTHING ON EARTH"

Truck carries a load of chemicals across drawbridge and into plant.

Truck stores 54 palletized rolls in space previously occupied by 15—a 250% improvement!

Carloading cut from 28 to 1.3 man-hours

Power Trucks also increase use of storage space 250% for prominent Textile Finisher

WHAT TRUCKS DO

Primary jobs are transporting chemicals, starches, dyes, paper and finished cloth. 8 to 10 million yards of cloth are handled monthly.

Five 800 lb. rolls being carried up ramp to boxcar. Previously 8 men with hand trucks took 3½ hours to load car; now truck operator and 1 helper do job in 40 minutes—only 5% of previous man-hours.

Trucks have strenuous schedule—24 hours per day in 3 eight-hour shifts. Trucks are also kept busy over week ends by engineering department for maintenance and repair work on machinery.

TRUCKS USED

Fleet consists of 6 Elwell-Parkers with ready-power (gas-electric).

ALL ONE MAKE OF TRUCKS

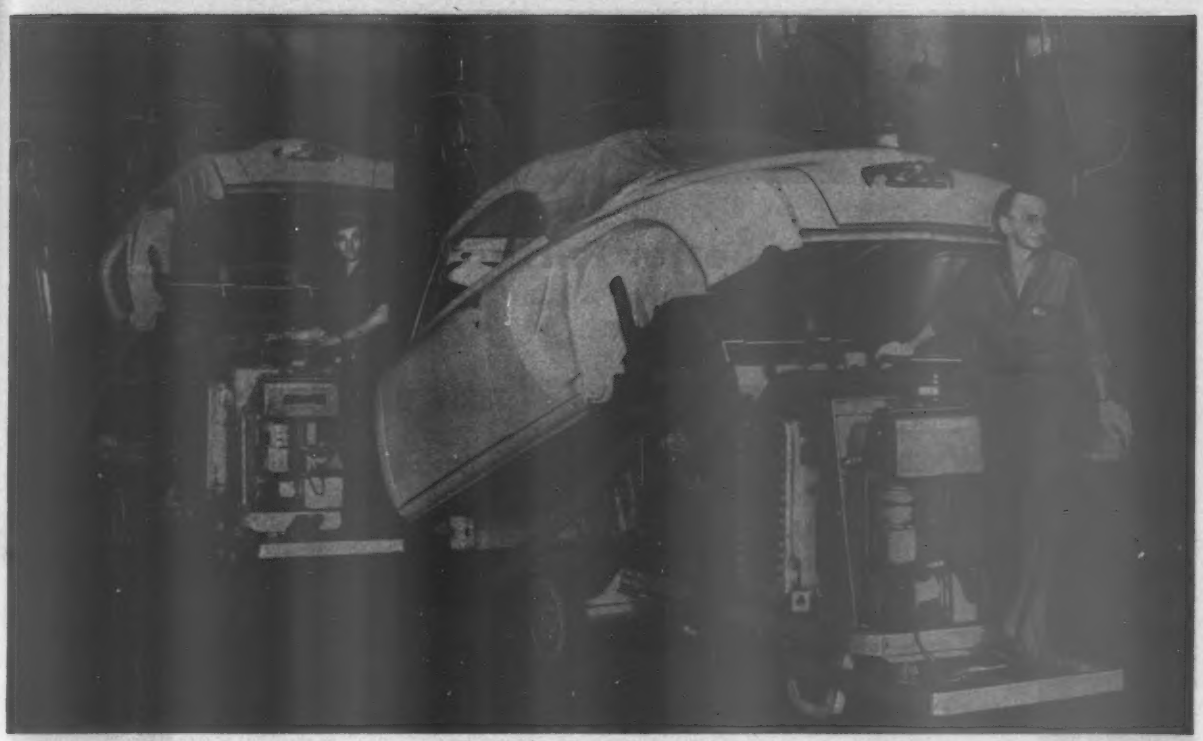
First Elwell-Parker was bought four years ago and extensively job-tested. It proved so satisfactory over former trucks that only Elwell-Parkers have been acquired since.

OPERATORS ENTHUSIASTIC

Competition is so keen for a truck job, that to become eligible 5 years' employment is now necessary. Each driver is responsible for the condition of his truck—the one having the lowest maintenance costs gets the newest equipment. Drivers who have an accident are temporarily "grounded."

LOW MAINTENANCE

Chief Engineer reports practically no cost or lost time for truck maintenance. A spare power unit was held in stock 3 years without being needed.



SYNCHRONIZATION to the Split Second!

Elwell-Parker Trucks prove their Dependability meeting exacting assembly line schedules

Auto bodies, completely assembled and finely finished, are fed to Studebaker's assembly line in great numbers and with incredible speed by Elwell-Parkers . . . Truck failures on such a critical operation would prove disastrous. But with reliable Elwell-Parkers, the line keeps rolling 'round the clock.

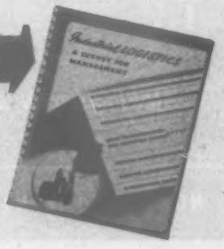
Fourteen years ago, Studebaker installed their first Elwell-Parker specially designed for this job. Now they use 12 on this operation alone! What better proof can you ask for of E-P dependability?

In addition, E-P trucks have repaid their cost many times by saving storage space. The trucks upend and store bodies vertically—3 times as many on the same floor space as compared to horizontal storage. As a result, a huge investment in new storage space has been avoided . . . Complete story on this installation furnished on request.

Whether you require continuous or only intermittent truck operations with an assurance of no down time, you can benefit from the remarkable dependability of Elwell-Parkers. Call in your near-by man for a materials handling system "tailored" to your needs. The Elwell-Parker Electric Company, 4021 St. Clair Ave., Cleveland 3, Ohio.

ELWELL-PARKER
POWER INDUSTRIAL TRUCKS
Established 1893

FREE BULLETIN
on Scientific Materials Handling. Write for "Industrial Logistics" and name your product.



You'll Get Better Performance Out of These 5 Feature Norton Mounted Wheels and Points

WHETHER you use mounted wheels and points by the dozen or by the thousands, you'll like the improved performance that you'll get from these Norton products. They are made by a *new process* in the *new* Norton grinding wheel plant.

1. **They Cut Fast**—Norton mounted wheels go right to work cutting—and fast—because they receive a truing operation which removes the "mold skin" and leaves the wheel bristling with sharp points.
2. **They Hug the Work**—Norton wheels are absolutely concentric because they are trued on their own spindles. They run true and smooth with no tendency to bounce on the work.
3. **They are Vibrationless**—Perfect balance is especially important in these small wheels which run at terrific speeds. Inherent balance is built into Norton wheels by the new Norton manufacturing process.
4. **They have Long Life**—All grains in the wheel share equally in the job of cutting. None are wasted by vibration and pounding. None have to be trued away to obtain concentricity.
5. **They are Uniform**—Improved mixing methods, precision molding and electric firing produce wheels even more alike than the peas in a pod. You get the same performance from *every* wheel.

Whether you are using mounted points and wheels for the fine finishing of delicate dies and molds or for real stock removal on intricate castings, you'll like the improved performance that you'll get with Norton. Write for catalog—ask for Form 43.

Making better products to make other products better

NORTON ABRASIVES

NORTON COMPANY, WORCESTER 6, MASS. · Warehouses in Five Cities · Distributors in All Principal Cities

Meet Today's Stepped-Up Demand

SPEED PRODUCTION

SHIP MORE GOODS FASTER

With Automatic Electric Trucks That Cut Material Handling Costs 50% to 75%

"101" TRANSPORTER

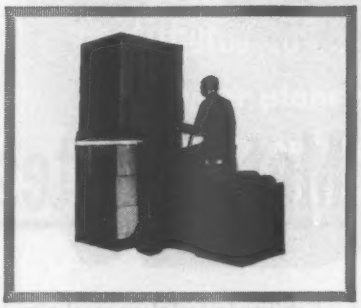
The famous electric-propelled motorized hand truck is offered in a complete line for horizontal movement of unit loads on skids or pallets.

"101" TRANSTACKER

Battery-powered motorized hand truck stacker available in single-lift and telescopic models, for moving and stacking materials of all types in unit loads.

Featherweight SKYLIFT

Ability to maneuver in cramped quarters and lightweight make this Skylift fork truck ideal for operation in narrow aisles, and in areas where floor or elevator capacities are limited.

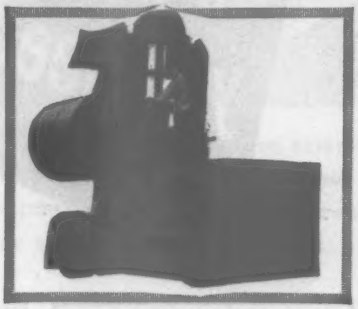


TRANSRIDER STACKER

Low initial cost, rider-type stacker combines lightweight with compactness for operation in crowded quarters.

SKYLIFT

Available in a wide range of models and capacities, Skylift fork trucks offer many important engineering advancements never before found in a fork truck.



SKYLIFT GIANT

Designed for heavy duty handling requirements, the Skylift Giant is available in capacities ranging from 20,000 pounds to 60,000 pounds.

These amazing cost-cutting electric trucks lift, move and stack hundreds of pounds or tons and tons of your products with easy finger-tip control. Empty air space in your warehouse can be turned into extra storage space with Automatic Electric Trucks that stack ceiling high. You'll find these trucks pay for themselves in as little as months . . . save you costly man hours and release men from back breaking hand handling for more productive work to help you meet today's stepped up demand.

Let us show you how they speed production, get rid of costly bottlenecks, delayed deliveries . . . help you ship more goods faster!

Write, call or telephone us for facts about how to increase efficiency and save money in *your* business.

WRITE FOR FREE BOOKLET TODAY

Please send me facts on how to SPEED PRODUCTION and SHIP MORE GOODS FASTER with Automatic Electric Trucks . . . also FREE Money-Saver Check Chart.

Trade **Automatic** Mark

39 West 87th Street, Dept. B-5, Chicago 20, Illinois

Please send me facts on how to SPEED PRODUCTION and SHIP MORE GOODS FASTER with Automatic Electric Trucks . . . *also* free booklet: "How to Make Your Material Handling Pay Dividends."

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ALLEGHENY LUDLUM BLUE SHEETS

There is a Blue Sheet for each individual grade of Allegheny Metal, giving full information on its physical and chemical properties and characteristics. Let us send you this certified, laboratory-proved data on the stainless grades in which you are interested.

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For any job which involves the handling of large volumes, heat and high pressures—either singly or all at one time—Allegheny Metal solid or clad plates are produced in the exact stainless grade required to combat corrosion, oxidation and contamination of the product.

Some of these grades are *new* . . . comparatively recent developments of our research and experience as a pioneer and leader in stainless steel production. Others are improved versions of older analyses. The latest information on the entire subject of stainless plates is available to you in the booklet illustrated above—32 pages of valuable data on types, sizes, finishes, fabricating methods and uses, including ASTM and ASME boiler codes.

Specify "Allegheny Metal" for complete reliability in stainless steel plates, and write for your copy of the A-L Plate Book.

ALLEGHENY LUDLUM STEEL CORPORATION
Pittsburgh, Pa.

Nation's Leading Producer of Stainless Steels in All Forms

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ALLEGHENY METAL is stocked by all Joseph T. Ryerson & Son, Inc. warehouses

Pittsburgh

contributes to

- Higher plant efficiency
- Greater safety
- Better housekeeping

White Sewing Machine Corporation utilizes scientific application of the *energy in color* in six and one-half million dollar expansion program to improve working conditions and increase production.

THE WHITE SEWING MACHINE CORPORATION, of Cleveland, Ohio, built more units last year than in any preceding year in its history. Production executives attribute a substantial part of this increase to Pittsburgh COLOR DYNAMICS.

● **Recently,** White embarked upon a six and one-half million dollar modernization and expansion program. Included was the purchase and remodelling of a building to house an up-to-date metal division. This plant now turns out more machines with less floor space than the old factory.

● **"Several years ago** we used Pittsburgh COLOR DYNAMICS in repainting our main offices," writes E. J. Sebek, Vice-President in charge of manufacturing. "So beneficial did this practical use of the *energy in color* prove to be that we decided to use this system in 'color engineering' the new plant.

● **"In place of drab,** brown walls, we now have attractive surroundings of *eye-rest* and *morale-building* colors. *Focal* colors on working parts of machines reduce eye-strain. Our workers see their jobs better and do not tire as quickly. Nor do they sustain as many lost-time accidents because controls and hazard areas are clearly indicated by *safety* colors.

● **"Volume and quality** of production have been improved. Morale has been raised by the better and cleaner working conditions. Our workers take greater pride in their surroundings so that housekeeping problems have been reduced.

● **"We have** a constant stream of visitors to this new plant. Many of these are production executives from other companies who are eager to see what we have done and how. We are always happy to recommend the use of COLOR DYNAMICS to them because of what it has accomplished."

● **Why not investigate** what Pittsburgh COLOR DYNAMICS might do for you? Try it on a few machines or in a department or two—and see the difference it makes!

FREE—Color Engineering Study of Your Plant on Request!

● **For a complete explanation** of COLOR DYNAMICS, send for our free, profusely-illustrated booklet. Better still, let us make a scientific engineering study for you—free and without obligation. There's a trained COLOR DYNAMICS expert at each of our 75 warehouses. Call your nearest Pittsburgh Plate Glass Company branch and arrange to have a representative see you at your convenience. Or mail coupon.

SEND FOR A COPY OF THIS BOOK!

Pittsburgh Plate Glass Co., Paint Div.
Department FM-21, Pittsburgh 22, Pa.

☐ Please send me a FREE copy of your new revised and enlarged Booklet, "*Color Dynamics In Industry.*"

☐ Please have your representative call for a Color Dynamics Survey of our properties without obligation on our part.

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PITTSBURGH PAINTS

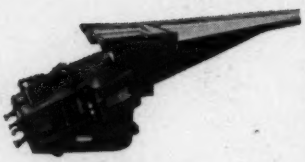
PAINTS • GLASS • CHEMICALS • BRUSHES • PLASTICS

PITTSBURGH PLATE GLASS COMPANY

LOOK AT ALL THESE . . .

and all provide absolute control over tonnage handled in feeding and conveying operations

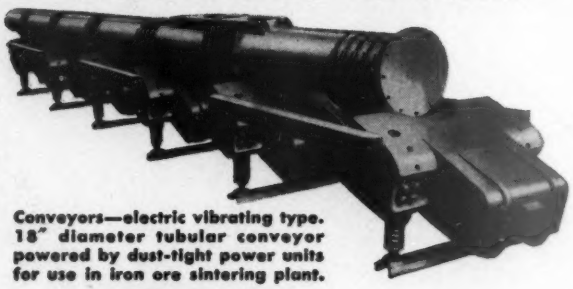
Small Reagent Feeders—with open or enclosed decks for capacities from 10 to 4000 lbs. per hour.



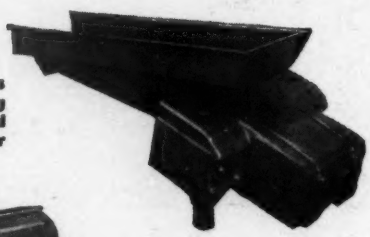
Spreading Feeders—for distributing materials evenly across wide surfaces.

Built in a wide range of types and sizes, Jeffrey electric vibrating Feeders and Conveyors provide absolute control over tonnage handled. Open or enclosed pan, or tubular decks, for capacities ranging from a few pounds to fifteen hundred tons per hour. Investigate the accuracy of this equipment.

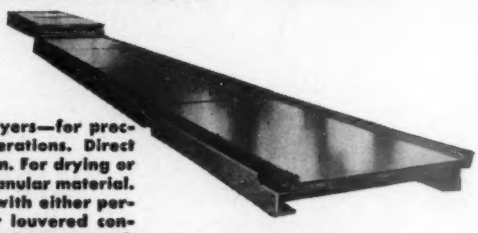
Spark-Proof Feeders (left)—for use in explosive atmospheres or where moisture conditions require special protection of coils.



Conveyors—electric vibrating type. 18" diameter tubular conveyor powered by dust-tight power units for use in iron ore sintering plant.



Dust-Tight Feeders (right) — vibrating motor gaps protected from magnetic dust, or explosive dust.

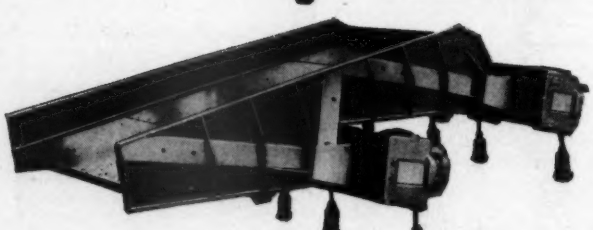


Coolers-Dryers—for processing operations. Direct type shown. For drying or cooling granular material. Equipped with either perforated or louvered conveying surface through which air or gasses are passed.

Water-Jacketed Feeders (left)—for feeding furnaces and driers, or handling hot material to coolers, etc.

Bin Level Indicator (above)—shows bin level at a glance to control feed to bin, maintain bin level or control discharging equipment.

Low Head type Barrel Packer (above)—a real economy in reducing size of containers, increasing capacity and cutting shipping costs. Can be supplied with deck to provide conveying action during packing operations.



Large Capacity HEAVY DUTY Pan Feeders

Also electric vibrating Screens, Bin Check Valves, Electronic Controls, Magnetic Separators and Mechanical Vibrating Conveyors. Let us tell you more about these units and what they can do for you. Write us today.

THE JEFFREY MANUFACTURING COMPANY Established 1877

911 North Fourth St., Columbus 16, Ohio

Complete Line of Material Handling, Processing and Mining Equipment

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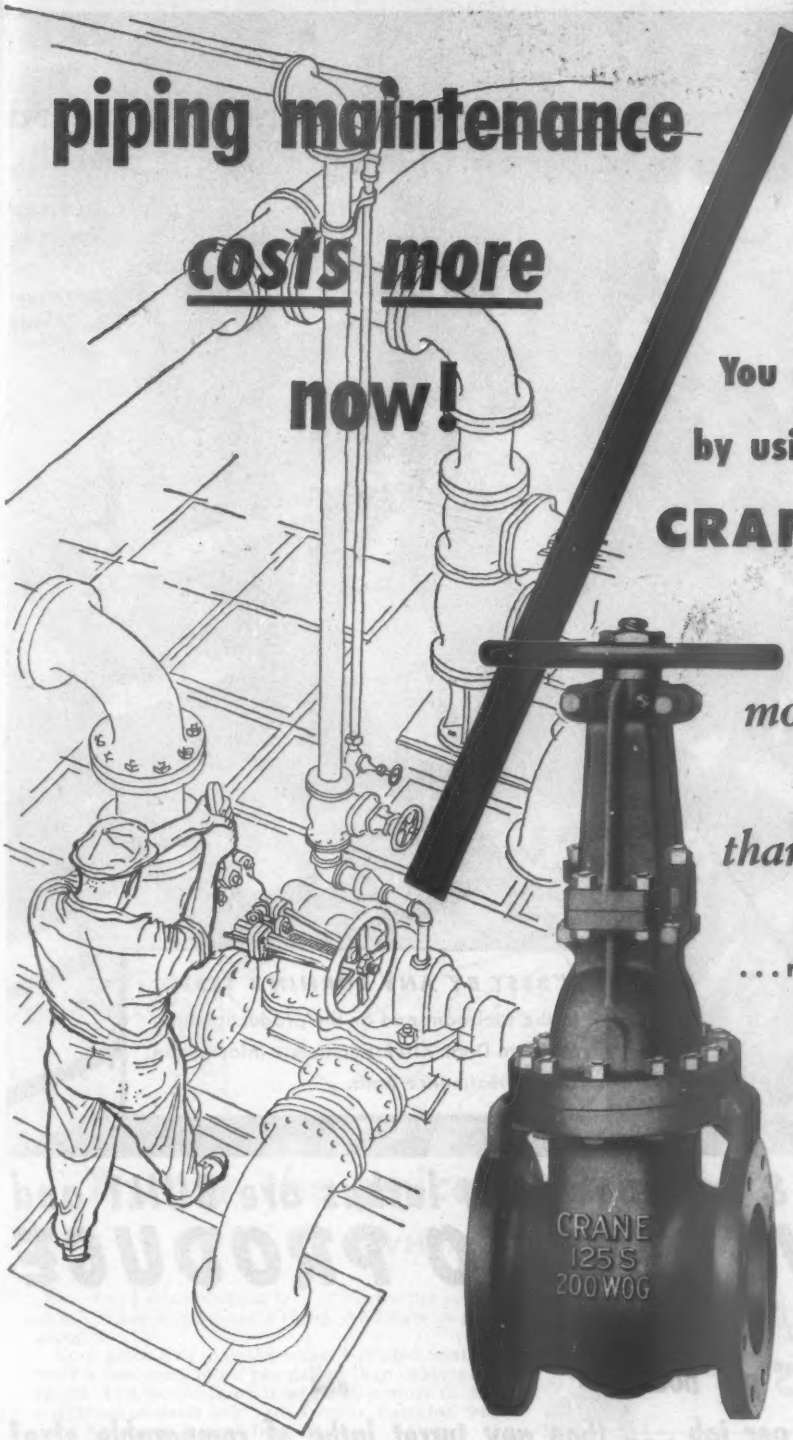

You do less of it

by using Dependable Quality

CRANE VALVES

That's why more Crane Valves are used than any other make

. . . no bonnet trouble with this valve

A typical example of low-maintenance Crane Quality—No. 465½ 125-Pound Iron Body Gates. Rarely does the bonnet joint need attention. Flange construction includes reinforcement to prevent distortion and utilizes more bolts, more closely spaced than is usual in valves of this class. Crane precision-guided seating reduces seat and disc wear. Packing has long life because these valves have a deep stuffing box filled with high grade asbestos ring packing. A ball-type gland equalizes the packing load.

Better performance features like these make Crane the better buy in valves of every type. Ask your Crane Representative for a demonstration.

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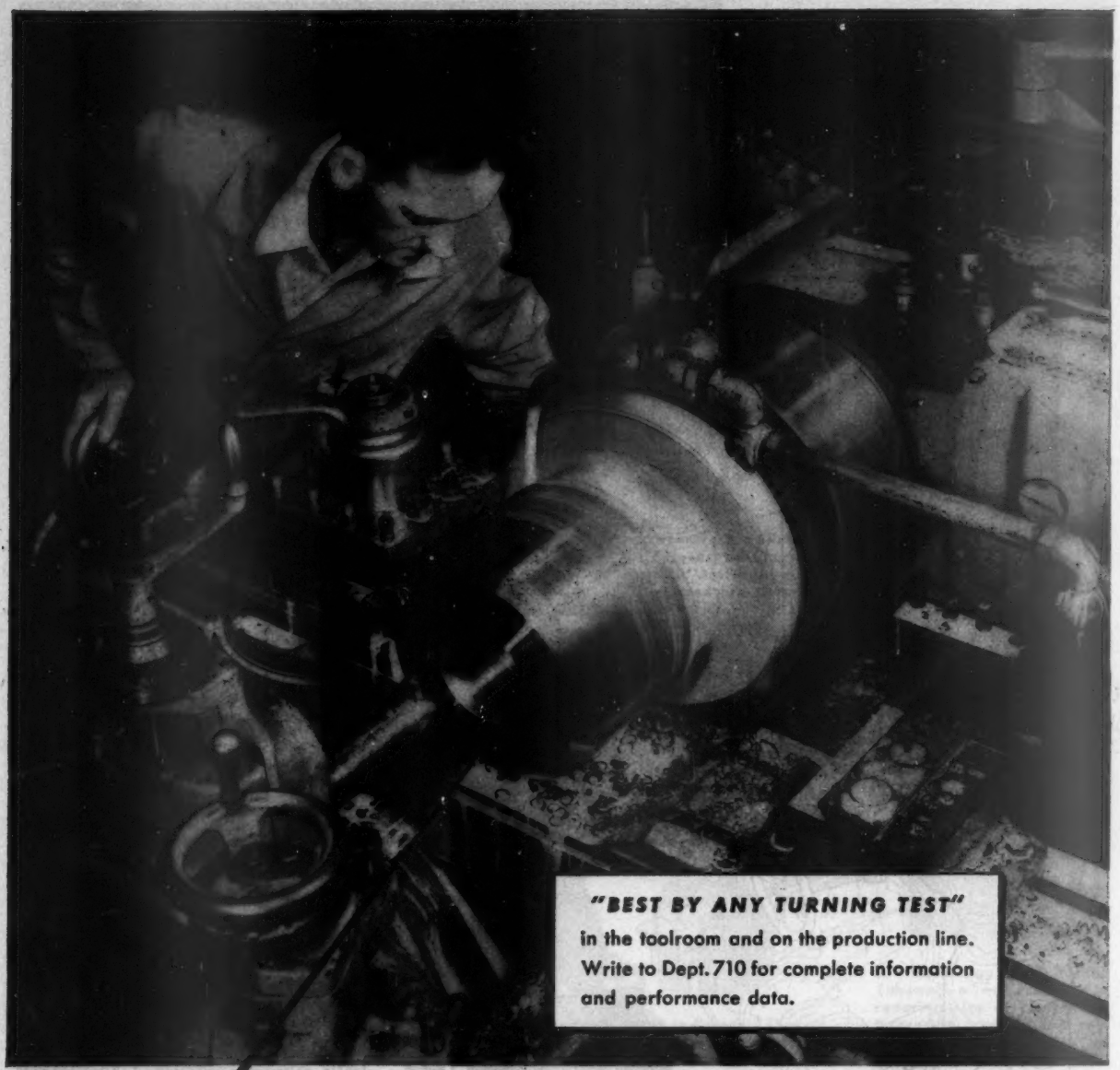
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in the toolroom and on the production line.
Write to Dept. 710 for complete information
and performance data.

Jones & Lamson turret lathes are BUILT and POWERED TO PRODUCE

MORE CHIPS per tool
MORE PIECES per hour
MORE PROFIT per job . . . than any turret lathe of comparable size!

Turret Lathe Division **JONES & LAMSON** MACHINE COMPANY
Springfield, Vermont, U.S.A.
MACHINE TOOL CRAFTSMEN SINCE 1835

Throw the price lists away

WHEN FIGURING YOUR PAINTING COSTS

Yes, we're sincere about it . . . "Throw the price lists away". They don't mean a thing. And here is positive proof.

Your price lists may show that Barreled Sunlight costs a few cents more per gallon than other good paints. You would think it might cost more to do a maintenance paint job with famous Barreled Sunlight, but that is wrong. It won't.

Why? Because when properly thinned a five-gallon can of Barreled Sunlight gives you six gallons ready for the brush. So you save from the very start by buying less paint.

But that is only 20% of the story. The big factor . . . the 80% of the cost of any paint job . . . is *in your labor.* This is where Barreled Sunlight, with its faster flow, better coverage and greater yardage per man hour really saves you money.

This simple test will prove it! Compare a gallon of Barreled Sunlight with a gallon of any other paint . . . *paint it on a wall.* Compare them for appearance, square feet of surface covered *and time involved for application.*

Such a test will convince you that Barreled Sunlight can give you a better-looking, longer-lasting paint job for less money than any other paint.

BARRELED SUNLIGHT PAINT CO.
2-8 Dudley St., Providence, R. I.

Barreled Sunlight
Paints

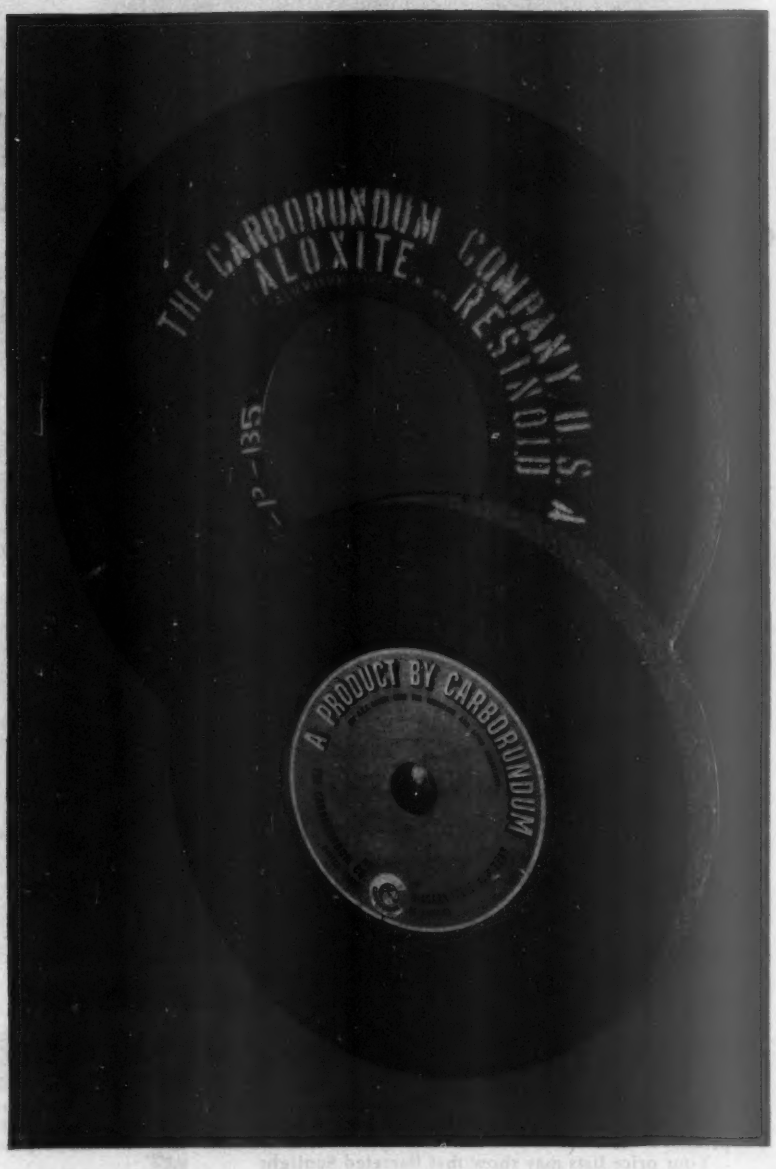
In whitest white or clean, clear, pleasing colors, there's a Barreled Sunlight Paint for every job

IT ALWAYS COSTS MORE NOT TO PAINT!

It takes the RIGHT

TYPICAL OF MORE recent developments by CARBORUNDUM are new bonds that are setting records for productivity in high-speed grinding operations... for efficient cutting in low-speed grinding of high tensile strength metals... and for production economy in grinding gray iron, hard malleables, semi-steel and non-ferrous metals.

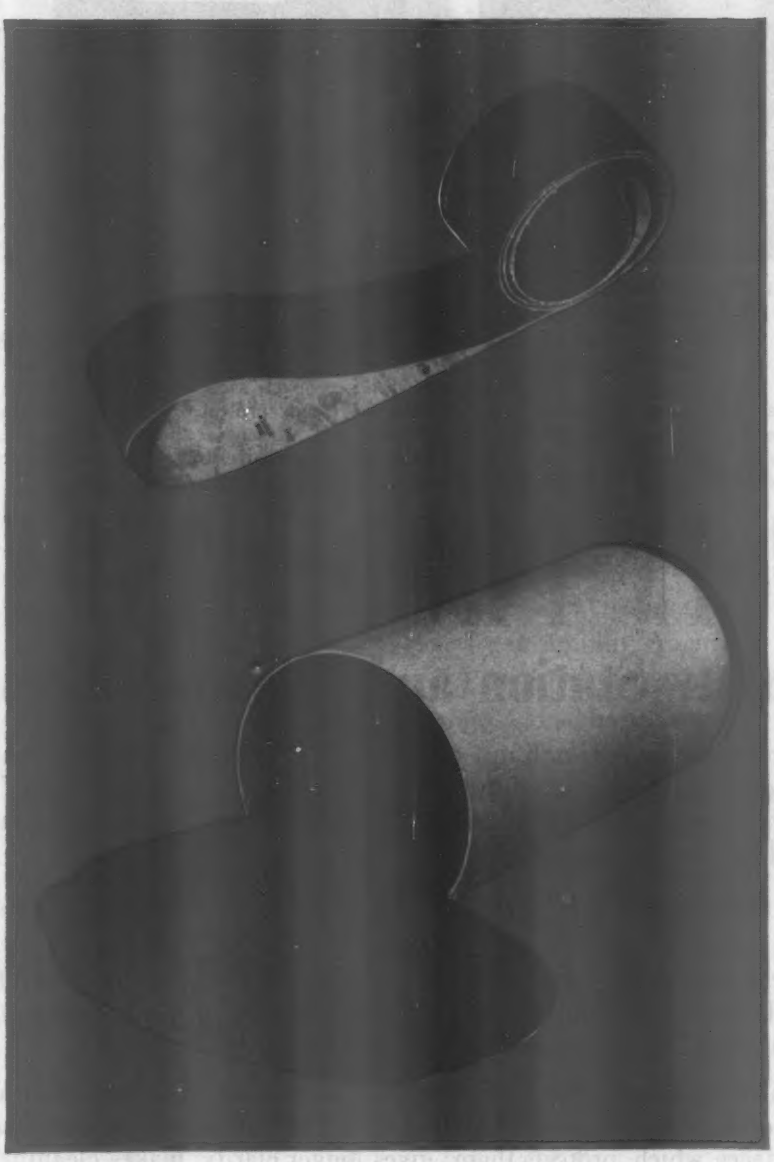
INDUSTRIAL CLOTH BELTS, with special thermosetting resin bond, resist frictional heat... permit faster grinding speeds and higher production rates. They cut clean, fast, true and much cooler than ordinary belts. Recommended for tough hot grinding jobs.



Only **CARBO** TRADE

"Carborundum" and "Aloxite" are registered trademarks which indicate manufacture by The Carborundum Company, Niagara Falls, New York.

Abrasive to do the job RIGHT



Efficiency and economy in metalworking are more important than ever in these days of constantly rising production costs. Vital in this connection is the use of the *right* abrasive in each cutting or grinding operation.

Only CARBORUNDUM manufactures a *complete* line of abrasive products from which proper selection can be made. Only when you order products by CARBORUNDUM can you be sure of impartial recommendation of the *right* abrasive for the job, in every case. For most efficient, economical results throughout—standardize on abrasives by CARBORUNDUM.

ALOXITE TP aluminum oxide grain has the fast cutting action needed for polishing hard metals. It is being used in an increasing number of plants for polishing all types of steel and other metals of high tensile strength.

RUNDUM

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makes ALL Abrasive Products...to give you the proper ONE

FACTORIES: Dirty goggles endanger production. Among craftsmen, on assembly lines, in workshops, refineries, process and machine operations of every sort, MAGIC LENS TISSUES mean crystal-clear sight. They are used because they are easy to use, and do their good job all in one operation—and quick!

OFFICES, LABORATORIES, ENGINEERING DEPARTMENTS: "We find your product excellent. It is kept in constant use, and we are now placing it in all our offices," writes a famous insurance firm. (Over 65% of the entire American working force wears glasses, reports the U.S. Dept. of Commerce.)

SIMPLE DISPENSER FOR INTERFOLDED SHEETS: No moving parts; attractive, indestructible, compact, secure. Costs only $2.50. Takes the clean, protected Refill Cartridges instantly and dispenses the super-strength, jumbo-size silicone-treated sheets one-by-one without waste... and at a great saving.

PAYS OFF IN PRODUCTION

at every plant Safety Station and in your offices

When goggles and glasses get dirty there are two things you can do: Leave them dirty, or clean them. If you leave them dirty, production suffers, safety suffers, eyesight suffers. If you "clean" them with a rag, or ordinary fiber paper, lint and smears stick to most lenses. If you fuss with a cleaning fluid, time is wasted by this old-fashioned method.

What you really want to do is both *clean* and *polish*—and protect—the lens; quicker, easier, brighter, longer-lasting.

Accordingly, against our background of 25 years in the pulp and paper industry, the General Electric Company (Silicones Division) and ourselves entered into the combined development of a superior silicone-treated tissue. This has been achieved — at a great saving to you.

Rub this MAGIC LENS TISSUE over lens. See how dust, dirt and smears disappear and a sparkling—and preserving—polish occurs at once. MAGIC LENS TISSUE leaves an invisible coating of silicone on the surfaces which protects them; gives longer clarity, makes cleaning easier, better, quicker, more lasting. NO BOTHER. NO WASTE. NO FLUID. It's General Electric Silicone — from the G.E. House of Magic — that does it.

COMPARE THESE ADVANTAGES AND PRICES—AND ORDER YOUR INSTALLATIONS NOW!

DISPENSER: Lock-and-key feature; four steel mounting screws; strong 20-gauge cold-rolled steel construction; and baked enamel finished in beautiful National Safety Council Green. Does credit to any plant or office..... $ 2.50

REFILLS: 800 sheets per packet, each sheet 5" x 6¾" instead of usual 3" x 7"; wrapped in sanitary wrapper for cleanliness and convenience, packed 6 packets to the carton @ $1.40 per packet. This means per carton..... $ 8.40

All prices FOB our factories and subject to change without notice. $10.90

REMEMBER — DIRTY GOGGLES ENDANGER PRODUCTION

. . . You Have To Make It EASY

A workman is no better than the eyes he works with. Workmen work better, safer, faster, more efficiently—more accurately—with crystal-clear sight. But goggles stay dirty and dangerous unless you make it as easy as possible for workmen to clean them.

To avoid a complicated and costly dispenser MAGIC LENS TISSUE reaches you in interfolded form from our special interfolding machines. It comes ready-to-use in this most economical and convenient way, and is priced at an industrial price for widest distribution . . . more economical per sheet, *yet each sheet is over 50% larger than usual.* You need a big sheet, and that's what you get . . . yet it costs less.

The tissue is, without question, the finest paper that can be made . . . scientifically controlled at every step . . . treated to give softness, super-strength, and freedom from lint. It stands hard handling without tearing, and does its job fast . . . a product of research and experience.

. . . It PAYS . . . and PAYS . . . and PAYS

The proved value to you in production, in safety, in morale, in utility and economy, and in the great reduction in the daily time consumed in cleaning goggles and glasses is testified to by such exacting and diversified users as, for example: American Can, Bell Telephone, Caterpillar Tractor, Ethyl, Hanford Atomic Works, Ingersoll-Rand, International Business Machines, Murray Body Corporation, Kennecott Copper, Miles Laboratories, National Gypsum, Niagara Mohawk Power, Ralston-Purina, Rayonier Pulp & Paper, Shell Chemical, Socony-Vacuum, Sun Oil, Union Carbide & Carbon Corporation, Universal Atlas Cement, United States Steel, U. S. Navy, Westinghouse, etc. Wire or write us, or order through your safety supplies jobber—today.

The Refill Cartridge comes ready for instant use. Super-strong, jumbo-size sheets . . . yet they cost less.

. . . ORDER NOW!

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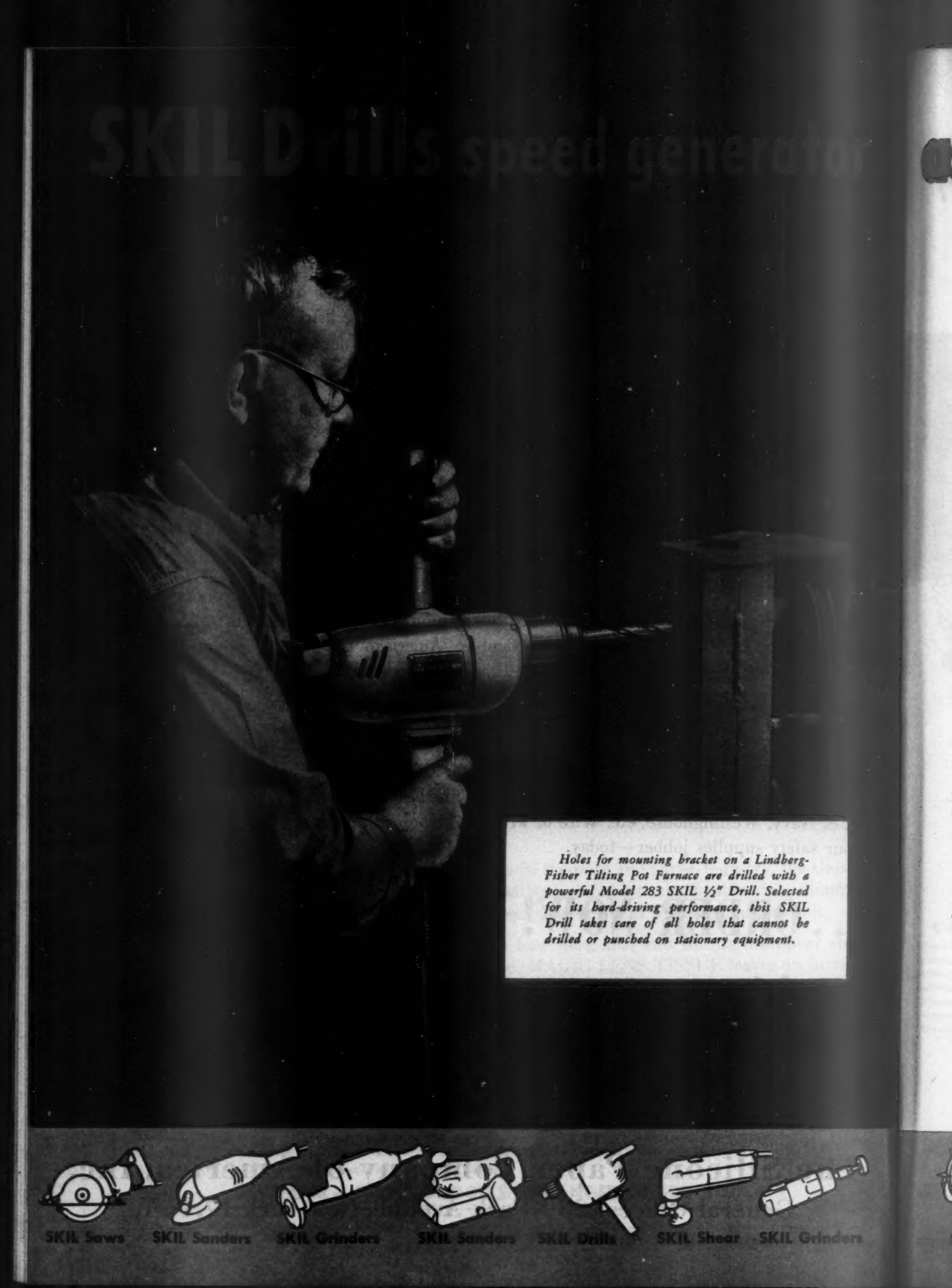
SKIL Drills speed generator



Holes for mounting bracket on a Lindberg-Fisher Tilting Pot Furnace are drilled with a powerful Model 283 SKIL ½" Drill. Selected for its hard-driving performance, this SKIL Drill takes care of all holes that cannot be drilled or punched on stationary equipment.

assembly at Lindberg Engineering Company

SKIL 1/4" and 1/2" Drills cut costs, save time on production lines...

Walk through the large Lindberg shops. You'll find real production efficiency . . . *and you'll find fast-working SKIL Drills* . . . in every department. See how easily they handle on every job and on every operation where electric drills are used. Like other leading manufacturers everywhere, Lindberg has relied on SKIL equipment for years.

Prove SKIL performance the sure way—try them in your plant on your tough production or maintenance jobs! Ask your SKIL Tool Distributor to demonstrate SKIL Drills, Grinders, Sanders, Saws and other SKIL Tools today.

Model 825 SKIL Saw is used in the shipping department to saw lumber for a large export crate. Lindberg says, "SKIL Saws are used for work of this type to eliminate walking back and forth to the stationary saws, resulting in a great saving of time."

Holes for mounting water jacket covers on Lindberg HYEN Atmosphere Generators are drilled with a Model 45 SKIL 1/4" Drill. Model 45 is a favorite with men and women workers for its compact, lightweight construction; easy grip; effortless handling and its fast drilling in tight spots.

SKIL Products are made only by
SKILSAW, INC.
5033 Elston Ave., Chicago 30, Ill.
Factory Branches in Principal Cities
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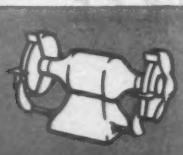
SKIL

PORTABLE POWER TOOLS

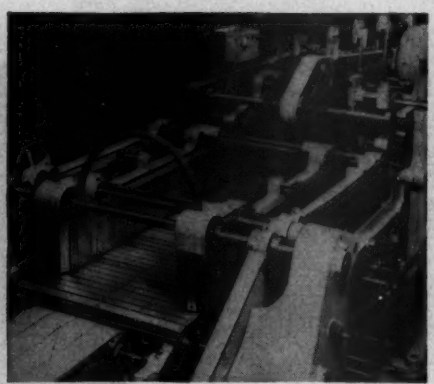


SKIL Grinders

SKIL Hammers

SKIL Drivers

You can Move... Lift... Lower Materials Economically with CHAIN CONVEYORS



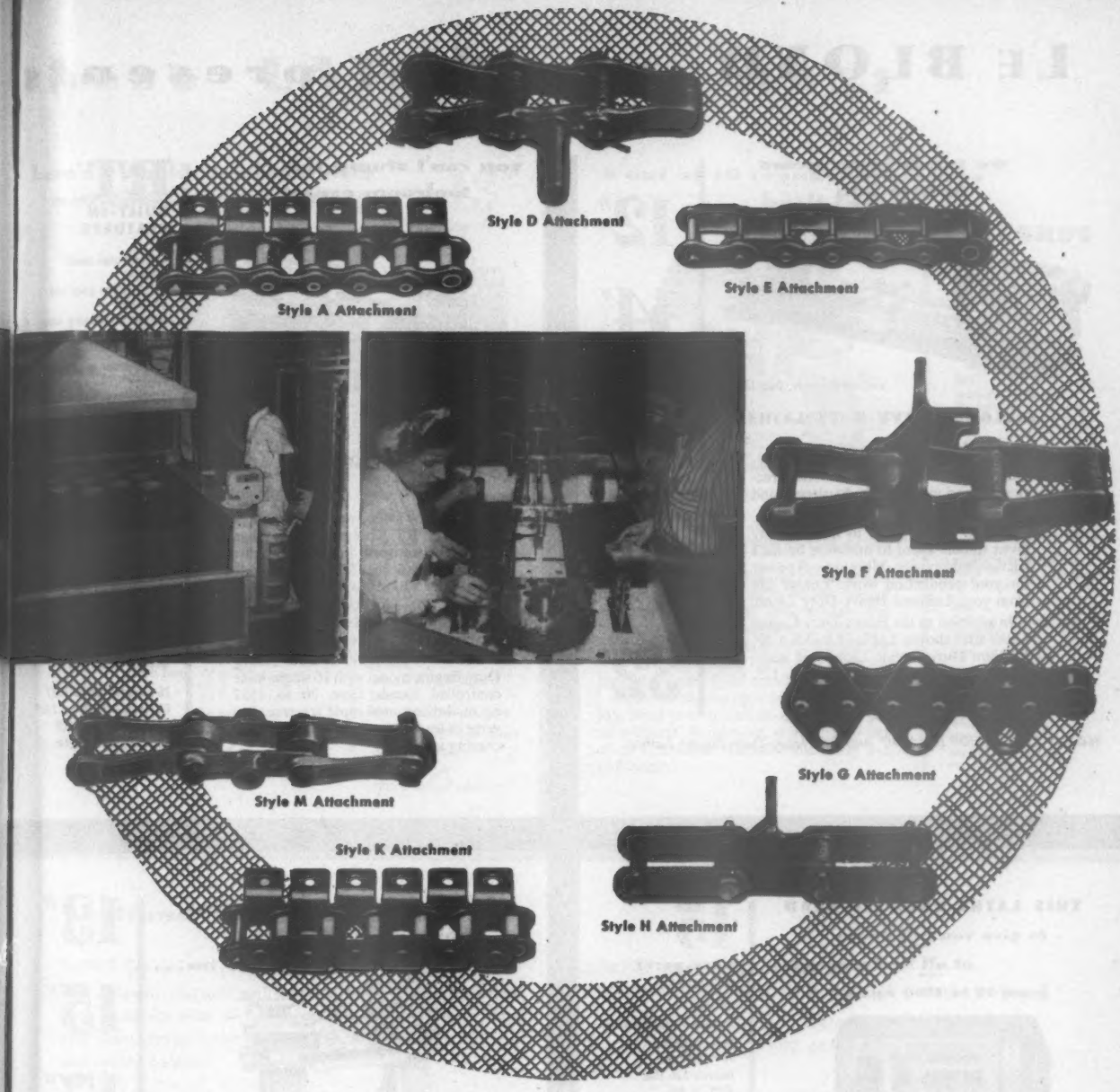
How . . . by what method . . . can you cut the cost of moving, lifting, lowering materials through processing, manufacturing or assembly stages? There is no one best or stock answer.

But, whatever your handling problem, raw materials, component parts, or finished products, consider the advantages of chain conveyors! They can be run in any direction . . . vertically, horizontally, up and down inclines or around corners. They can be fitted to your production flow schedule . . . assure a steady flow of material . . . eliminating the costly waiting time which usually results from an irregular material flow. They eliminate need for extensive storage space around machines . . . eliminate need for wide aisles. They eliminate the storage space required for other types of handling equipment . . . have far lower maintenance and repair costs.

And, in the *complete* Chain Belt line of conveyor chains and attachments you will find the one *best* chain that will most efficiently and economically serve you. In this complete line there are chains for every type of operating conditions . . . heavy or light loads, high or slow speeds, heat, corrosive or abrasive services. A wide range of attachments for each type of chain provides unusual versatility in solving materials handling problems.

A Chain Belt Field Sales Engineer will be happy to assist you in your chain selection problems. Or if you prefer, mail the coupon for your copy of Bulletin No. 50-35, containing interesting information on the application and use of chain conveyors.

Chain Belt COMPANY
OF MILWAUKEE



CHAIN BELT DISTRICT SALES OFFICES

Atlanta	Dallas	Los Angeles	Pittsburgh
Birmingham	Denver	Louisville	Portland
Boston	Detroit	Midland	St. Louis
Buffalo	Houston	Milwaukee	San Francisco
Chicago	Indianapolis	Minneapolis	Seattle
Cincinnati	Jacksonville	New York	Springfield
Cleveland	Kansas City	Philadelphia	Tulsa

REX

® BALDWIN REX

Be sure to call on us at our Booth at the Plant Maintenance Show at Cleveland, January 15th through 18th.

REX STOCK-CARRYING WAREHOUSES

Atlanta	Milwaukee	Seattle
Dallas	Portland	Springfield
Los Angeles	San Francisco	Worcester

DISTRIBUTORS THROUGHOUT THE WORLD

Chain Belt Co. 51-109
1667 W. Bruce St., Milwaukee 4, Wisconsin
Gentlemen: Please send me Bulletin 50-35.

Name.....

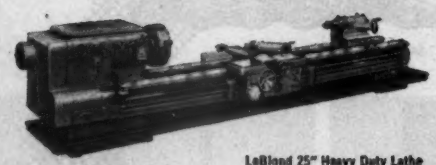
Company.....*Dept*.....

Address.....

City.....*State*.....

LE BLOND proudly presents

we mesh fewer gears to give you greater power on...



LeBlond 25" Heavy Duty Lathe

LeBLOND HEAVY DUTY LATHES

The headstock design of LeBlond Heavy-Duty Lathes incorporates the free-running principle, with hardened and ground steel gears.

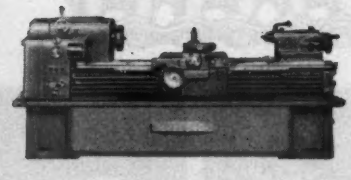
Result? Fewer gears in mesh at any given spindle speed to minimize no-load friction horsepower. More *smooth* power for your production work. Longer life from your LeBlond Heavy-Duty Lathe.

In addition to the Heavy-Duty Engine Lathe sizes shown, LeBlond builds a 20" Medium Duty Engine Lathe and accurate, versatile Toolroom Lathes in 12", 14", 16" and 20" sizes.

12"
14"
16"
20"
25"
32"

NOTE: *LeBlond also builds 40" and 50" Heavy-Duty Engine Lathes.*

you can't stump this toolroom expert



LeBLOND RT TOOLROOM LATHE

To our knowledge, the exclusive LeBlond 16" RT Toolroom Lathe has never been stumped! Infinitely variable speeds from 6 to 1500 r.p.m. Feeds from .0007" to 2.064". Threads from ¼ to 120—American, diametral, module and metric. 4-directional rapid traverse. Automatic chasing stop.

The RT is also built in a 16" Heavy Duty Engine model with 16 single-lever controlled speeds from 30 to 1537 r.p.m. 4-directional rapid traverse. Reverse to leadscrew at apron. Automatic chasing stop.

RT

BUILT-IN FEATURES

- 4-directional rapid traverse
- Combination gear and belt drive
- Automatic chasing stop
- Reverse to leadscrew at apron
- Single-lever positive-jaw feed control
- Single-lever speed choice
- Automatic lubrication through headstock, feedbox, apron

toolroom lathe

- Variable speeds—6 to 1500 r.p.m.
- 90 feeds—.0007" to 2.064"
- 90 threads—¼ to 120, American, module, metric
- Start-stop-reverse spindle control at apron
- 7½ horsepower motor

engine lathe

- 16 speeds—30 to 1537
- 60 feeds—.0013" to .230"
- 60 threads—2 to 120
- 15 horsepower motor

THIS LATHE USES ITS HEAD to give you full power at all twelve speeds from 28 to 1800 r.p.m.

LeBLOND DUAL-DRIVE

Dual Drive headstock design combines belt and gear drive to give you the widest range of speeds in the medium-price class—all at full horsepower.

Result? Smooth *full* power at high speeds—ideal for carbide and fine-finish turning. Rugged *full* power at low and intermediate speeds—for fast, efficient rough turning. Add convenient, single-lever speed control and the widest feed range in its class—and you have a lathe that does more jobs, faster, better, easier than any comparable machine.

15

DUAL-DRIVE FEATURES

- 15" swing
- Combination belt and gear drive
- Twelve speeds from 28 to 1800 r.p.m.
- Ninety-six feeds from .0004" to .106"
- Forty-eight threads from 4 to 224
- Single-lever speed control
- Totally-enclosed feed box
- Electric brake, forward and reverse spindle control at apron
- Single-lever positive jaw feed control
- Automatic lubrication through headstock and feed box
- Hardened steel gears and anti-friction bearings
- Multiple automatic length stops
- One-piece apron
- Hardened and ground replaceable steel bed ways
- Taper key drive spindle nose

LeBlond Dual-Drive Lathe

these heavy-duty features improve light-duty performance on...

LeBlond 17" Regal Lathe

LeBLOND REGAL LATHES

- Geared Headstock
- Quick-Change Feed Box
- Separate Leadscrew and Feed Rod
- Taper Key Drive Spindle Nose
- One-Piece Apron

Why can LeBlond give you the most rugged, dependable performance in the light-lathe class? Because only LeBlond can tap the vast engineering and production facilities of a plant building 76 lathe models. Add to this LeBlond's 63 years of leadership in machine tool design and production . . . and you have the LeBlond *combination* for top value in lathes.

13"
15"
17"
19"
21"
24"

NOTE: *LeBlond also builds Regals in these models:*
13" Bench • 17", 19", 21", 24" Gap
17/28" and 19/30" Sliding Bed Gap

these LATHES for 1951

here's a production lathe with a stripped-down price tag

LeBlond 13" Rapid Production Lathe

LeBLOND "RAPID PRODUCTION"

The price tag is the *only* "stripped-down" feature about this lathe. It was designed *especially* for your high-production turning and facing to give you a production machine that will handle a *variety* of work within the range *you* choose.

The 13" Rapid Production Lathe may be ordered with your choice of three headstocks that give you any of the following speed ranges:

6 speeds from	68 to 400 r.p.m. 102 to 600 r.p.m. 200 to 1200 r.p.m.
4 speeds from	450 to 3600 r.p.m. 600 to 3600 r.p.m. 600 to 1800 r.p.m.
2 speeds	600 and 1200 r.p.m. 900 and 1800 r.p.m. 1800 and 3600 r.p.m.
Single speeds	900 r.p.m. 1800 r.p.m. 3600 r.p.m.

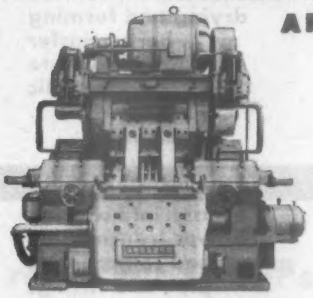
13"
17"
20"

PRODUCTIVE ATTACHMENTS

- Automatic back facing attachment
- Lever draw-in attachment
- Wheel draw-in attachment
- Air operated chuck
- Air operated tailstock
- Quick-acting, lever operated tailstock
- Special arbors
- Compound rest
- Plain and compound connected rests
- Plain connected rests
- Plain rest and turret tool post connected
- Taper attachment
- Standard multiple tool blocks
- Turret tool post on carriage
- Cross and length stops
- Chip Pan
- Motor driven coolant pump

17" and 20" machines are available with similar speed range choices

9 out of 10 crankshaft lathes built today ARE LeBLONDS



LeBlond ILB Crankshaft Lathe

LeBlond has been *the* pioneer and developer of modern crank-turning equipment since 1905.

LeBlond makes Lathes for roughing and finishing all elements of any crank—small air compressor types, automotives and huge diesel engine crankshafts. The complete line includes automatic Lathes for mass production and universal Lathes for handling a variety of cranks.

LeBlond has the right machine for your job. Send your specifications in today for an estimate. Remember, more than 9 out of 10 Crankshaft Lathes built today are LeBlonds!

7ACS
automatic rough-turning of line bearings

DM
automatic finishing of line bearings

1LB
automatic rough and finish turning of line bearings, flange and stub ends

2LB
same as 1LB but larger

6AC
automatic cheeking and rough or finish turning pin bearings

No. 1
universal crankshaft and automatic

26" UNIVERSAL HEAVY DUTY
universal for cranks of max. 3" throw

36" UNIVERSAL HEAVY DUTY
universal for cranks of max. 4" throw

LeBlond also builds

SLIDING BED GAP LATHES—16"/38", 25"/50" and 32"/60"
For a variety of parts with unusual or irregular projections such as shafts with large flanges, odd shaped blocks, large face diameters and many similar jobs requiring a flexible gap and center distance.

PLAIN BED GAP LATHES—12", 14", 16", 20", 25" and 32"
For jobs as above where adjustable gap is unnecessary.

HOLLOW SPINDLE LATHES—16", 27" and 30"
For oil country requirements or any work requiring large openings through the spindle.

AUTOMATIC LATHES—12" 16" and 3AC
For completely automatic machining with multiple tooling.

"HYDRA-TRACE" DUPLICATING ATTACHMENT
For smooth hydraulic turning and facing of a great variety of contours.

NO. 2 CUTTER GRINDER
Industry's standard for cutter sharpening and a wide range of toolroom grinding work.

COMPLETE LINE OF LATHE ATTACHMENTS

Sixty-four years of leadership in the design and production of machine tools stand behind every one of the 76 lathe models built by LeBlond. For the *right* lathe for your job, call your nearby LeBlond Distributor or write—

R. K. LeBLOND MACHINE TOOL COMPANY
Cincinnati 8, Ohio

Sales Offices in New York, Chicago and Detroit.

LeBLOND of Cincinnati

World's largest builder of a complete line of lathes.

Sweet's File for the Process Industries

1 processing equipment

crushing and grinding	a
mechanical separation	b
drying and forming	d
heat transfer	e
fabricated plate	f
non-metallic	g

2 mechanical equipment

material handling	a
power transmission	b
pumps and compressors	c
pipe and fittings	d
valves and traps	e
instruments and controls	f
lubrication	g
miscellaneous equipment and supplies	h

3 electrical equipment

motors and generators	a
controls	b

4 materials

metals	a
glass	c
thermal insulation	d
refractories	e
roofing and siding	g
waterproofing and dampproofing	h
flooring and wall covering	i
paints and finishes	J
other material	k

5 structural equipment

structural systems	a
doors and hardware	b
skylights and ventilators	c
partitions, fences and guards	d
chimneys	e

6 plant utilities

power generation	a
water conditioning, sewage and refuse disposal	b
air conditioning and refrigeration	c
lighting	d
protection and communication	e

7 service equipment, special services

service equipment	a
special services	b

looking for pla

plant utility and service equipment?

reach for Sweet's

All these manufacturers' catalogs—containing comprehensive information on power generation, water conditioning, sewage and refuse disposal, air conditioning, refrigeration, protection, communication, lighting and service equipment—are instantly available in Sections 6 and 7 of your Sweet's File for the Process Industries.

The other sections of this Sweet's File contain additional catalogs covering a wide range of materials and equipment . . . useful and up-to-date information on product forms, characteristics, performance and use.

This grouping of manufacturers' catalogs, in sections according to products or use of products, is made for your convenience, so that you can more readily compare one product with another. Indexes of manufacturers, products and trade names lead you quickly and easily to the catalogs you are looking for.

Sweet's is working constantly to get more manufacturers to send you their catalogs in this easy-to-use form. If you fail to find what you want, please tell us.

Sweet's catalog service

DIVISION OF F. W. DODGE CORPORATION
119 WEST 40th STREET NEW YORK 18, N. Y.

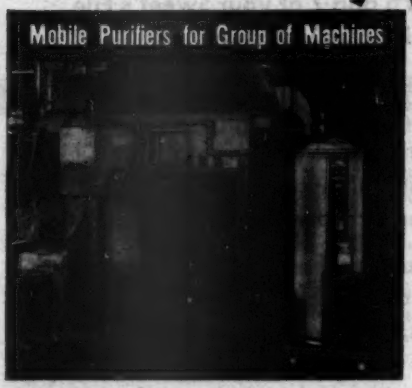
STOP downtime and expensive repairs on

hydraulic

.....PRESSES
MACHINE TOOLS
DIE CASTING PRESSES
PLASTIC MOULDING PRESS
INJECTION MOLDING MACHINES
BALERS, ETC.

Honan-Crane Hydraulic Oil Purifiers prevent excessive wear of hydraulic pump parts . . . prevent the clogging and sticking of control valves, pistons, and other hydraulic mechanism . . . provide longer safe use of hydraulic oils . . . greatly reduce oil consumption.

Honan-Crane Gives You the Exact Solution for Your Problem



A typical installation is illustrated by a Honan-Crane Mobile Purifier No. 14300, with pump and motor, which purifies 675 gallons of oil in nine Hydro-tel machines at Champion Machine and Forge Co.

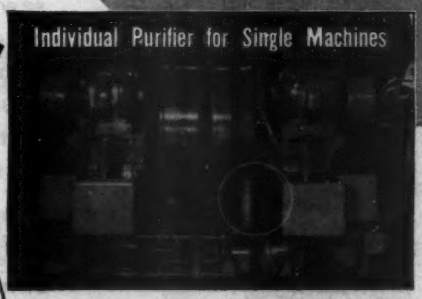
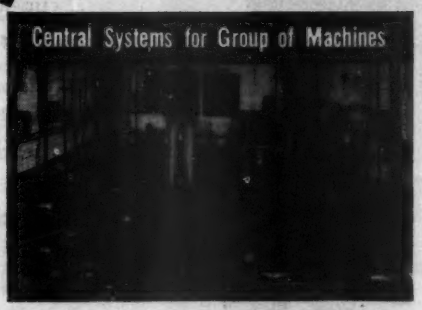


Illustration of Honan-Crane Purifier No. 711 direct connected to Norton Twin-O-Matic Grinder at Kaiser-Frazier Engine Plant.



Honan-Crane Model 24360 Purifier used to keep oil clean in a 2,000 gallon central system at Macklin Company.

also . . . Honan-Crane Purifiers for the purification of quenching oils. Many major companies such as Borg-Warner, International Harvester, Salisbury Axle, Cleveland Graphite Bronze, etc., find that purification of quench oils:

1. Greatly lengthens life of oil.
2. Prevents build up of contamination and loss of efficiency in coolers.
3. Provides easier cleaning of quenched parts.

also . . . Honan-Crane Filters and Clarifiers for oils and coolants used in metal working operations. Removal of dirt, chips, etc.:

1. Cuts down rejects.
2. Lengthens tool and wheel life.
3. Cuts down maintenance on machines.
4. Greatly reduces cost of oils and coolants.

Write today for complete bulletins on the purification of Hydraulic Oils and the Filtering of Metal Working Oils and Coolants.

Honan-Crane Corp.

325 Superior Ave., Lebanon, Indiana

Subsidiary of HOUDAILLE-HERSHEY CORP.

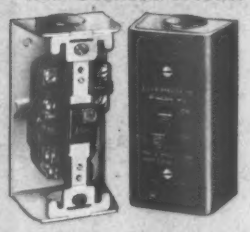
A COMPLETE LINE of MOTOR CONTROLS

Take your Pick—

Here are starters, contactors, relays, and pilot controls for all types of motorized machines. These devices . . . and many more . . . are listed in the latest Allen-Bradley Handy Catalog. Please send for it.

A-B Quality

FRACTIONAL HP STARTER
With Overload Breaker



Bulletin 600—Overload protection for your small motors.

MANUAL STARTER
Across-the-Line Type

Bulletin 609—Most popular hand operated motor starter.

MANUAL STARTER
Watertight Enclosure

Bulletin 609—For installations exposed to moisture conditions.

MANUAL STARTER
Reduced Voltage Type

Bulletin 646—Transformer starter for sq. cage motors.

SOLENOID RELAY
D. C. Enclosed

Bulletin 200—Relays listed in many contact arrangements.

SOLENOID RELAY
A. C. Universal

Bulletin 700 BX—Changeable from N.O. to N.C. contacts.

SOLENOID CONTACTOR
50 Ampere Rating

Bulletin 702—Contactors available up to 900 amperes.

AUTOMATIC STARTER
Reduced Voltage Type

Bulletin 746—Transformer starter for sq. cage motors.

SOLENOID STARTER
Size 1 • 5-7.5 hp

Bulletin 709—Most popular across-the-line motor starter.

SOLENOID STARTER
Size 2 • 15-25 hp

Bulletin 709—Magnetic starters for all types of service.

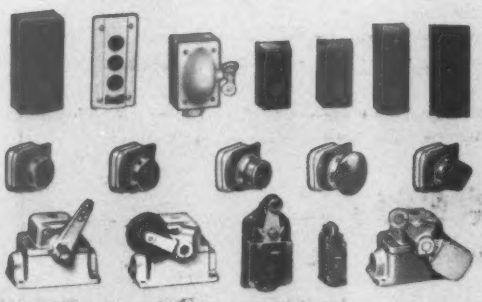
SOLENOID STARTER
Size 7 • 300-600 hp

Bulletin 709—The newest addition to A-B solenoid line.

COMBINATION STARTER
With Disconnect Switch

Bulletin 712—Saves space and makes neater installations.

STANDARD, HEAVY DUTY, AND OILTIGHT PUSH BUTTONS • LIMIT SWITCHES



See Next Page

QUALITY

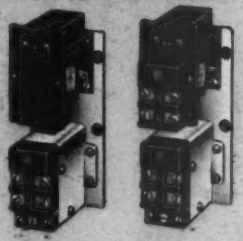
MOTOR CONTROL

SPECIAL PANELS • CONTROL CENTERS • ACCESSORIES

Allen-Bradley contactors, relays, and timers are widely preferred as components of special control panels. Their long, trouble free life accounts for their universal popularity with machinery builders.

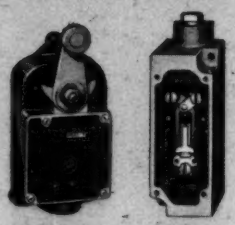
High production machines need automatic controls that are dependable and maintenance free. Allen-Bradley controls . . . good for millions of precision operations . . . are "tops" for performance and reliability.

PNEUMATIC TIMERS
From 1/6 to 180 Seconds



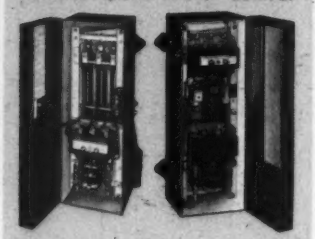
Bulletin 849—Dependable timer for a-c & d-c circuits.

LIMIT SWITCHES
Standard & Precision



Bulletin 801—Standard duty.
Bulletin 802—Precision duty.

A-C RESISTANCE STARTERS
Velvet Smooth Motor Control

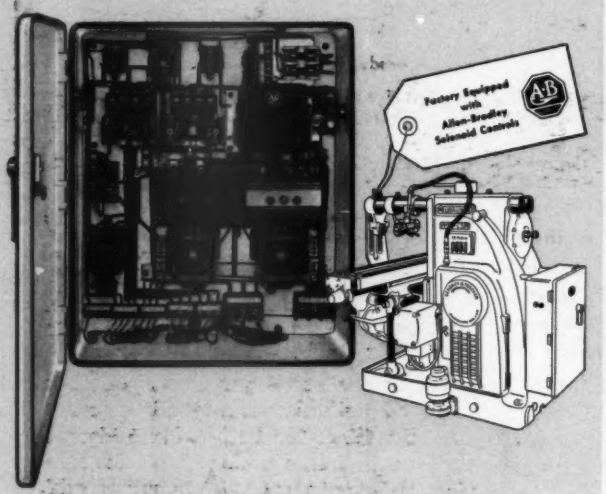


Bulletin 640—Manual type.
Bulletin 740—Automatic type.

D-C MAGNETIC STARTERS
For General Applications

Bulletin 265 with automatic time limit motor acceleration.

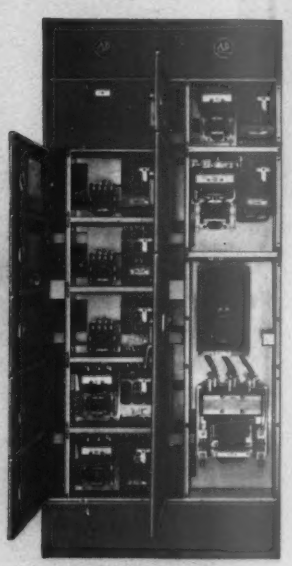
SPECIAL PANELS FOR SEQUENCE CONTROL
Any Size • Any Sequence • Any Machine



Special Panels—Allen-Bradley special control panels can be designed for any sequence of automatic operation of motor driven machines. Let us handle your control problems for you.

MULTI-UNIT CONTROL CENTERS
For Centralized Operation

Bulletin 798 Control Center—All controls are centralized in a neat, compact installation.



Bulletin 798—*With Doors Open*—Shows arrangement of various multi-unit controls.

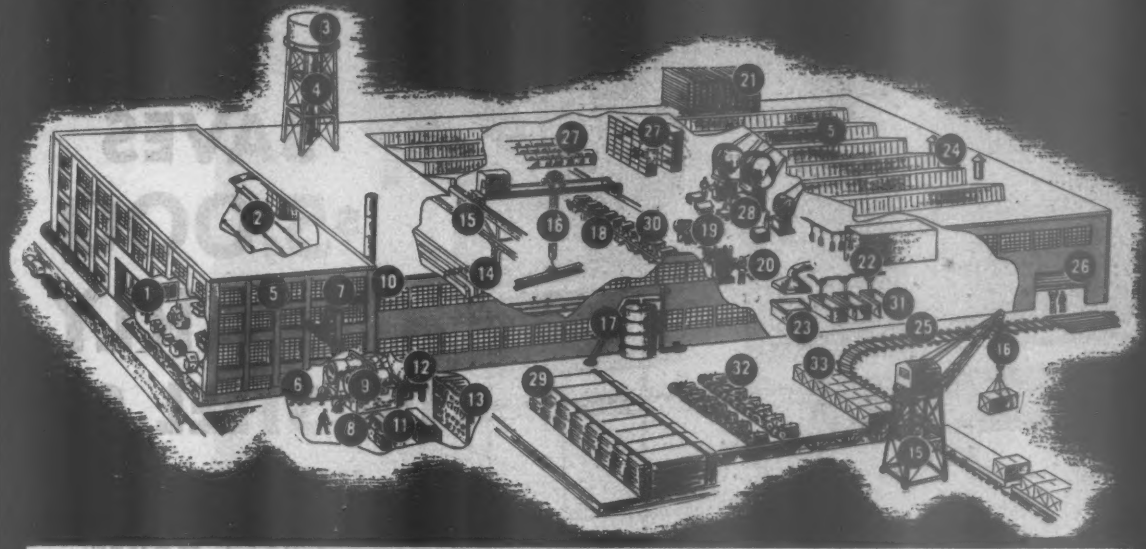
A-B Quality

ALLEN-BRADLEY
QUALITY
MOTOR CONTROL
1316 S. SECOND STREET, MILWAUKEE 4, WIS.

STANDARD ENCLOSURES
For Every Service

See Preceding Page

LOST: $6,000,000,000 FROM RUST!



MAINTENANCE USES

1. Products display
2. Sprinkler system
3. Water tank
   Exterior
   Interior
4. Riser and Tower
5. Window sash
6. Piping
7. Fire escape
8. Boiler room maintenance
9. Boiler setting
10. Gutters and down spouts
    Exterior
    Interior
11. Stored metal
12. Various tanks and air reservoirs
    Exterior
    Interior
13. Electrical control panel, bus bars, battery terminals, conduit
14. Valves, bonnets, stems
15. Structural steel
16. Chains and cables
17. Piping—Insulation on piping
18. Conveyors
19. Templates, dies, and gauges in storage
20. Stored machinery
21. Cooling tower
22. Drying ovens
23. Acid tank and ventilator hood
24. Ventilators
25. Railroad track, rail joints
26. Steel overhead doors

PRODUCTION USES

27. Parts in storage
28. Metal stampings
29. Stock metal in storage
30. Production parts
31. Shipping production items
32. Finished production items
33. Export shipments

HOW MUCH IS YOUR PLANT CONTRIBUTING?

This year—every year, rust takes its tremendous toll in industrial plants throughout the country. In dozens of places throughout your building, from water tower to boiler room, in structural metal as well as during the fabrication of metal products, rust is silently at work, destroying valuable equipment, lowering profits, increasing maintenance costs.

Regardless of the cause of corrosion in your plant, or the extent of protection necessary, there is a correct NO-OX-ID rust preventive designed specifically to give you positive protection—chemically, by stopping corrosive action, mechanically by sealing off corrosive elements.

Check your plant for the typically vulnerable areas illustrated. Let the Dearborn sales engineer make a complete Plant Inspection Survey and then recommend the correct NO-OX-ID.

There is a correct Dearborn NO-OX-ID to combat and protect against rust wherever it threatens.

DEARBORN CHEMICAL COMPANY
General Offices: 310 S. Michigan Ave. • Chicago 4, Illinois

Dearborn
Reg. U. S. Pat. Off.
THE ORIGINAL RUST PREVENTIVE
NO-OX-ID
IRON RUST

Dearborn Chemical Company
310 S. Michigan Ave., Dept. F
Chicago 4, Illinois

Gentlemen:
Please send me a copy of your introduction to NO-OX-ID rust preventives.

Name.....

Company.....

Address.....

City.....*Zone*.....*State*.....

SAVES $5,000 YEARLY ON STEEL COST

Unloading Time Cut 2 Hours Per Railroad Car

5-ton, 3-runway, 50-ft. span, completely motorized Cleveland Tramrail bridge operated by pushbuttons from floor. Bridge is shown interlocked with track extending out doorway over railroad. This Tramrail system has been in service since 1943.

A handsome dividend is being earned by the Kortick Manufacturing Co., San Francisco, Calif., on its Tramrail transfer bridge installation.

Because the bridge is of 5 tons capacity, the rods, bars and angle iron which Kortick uses for the manufacture of pole line hardware, can be bought and handled in 5-ton bundles. This eliminates a bundling charge made for smaller bundles. The savings is $2.00 per ton. As Kortick takes in an average of 200 tons per month, the monthly saving amounts to $400.

The bridge interlocks with an outside Tramrail track that extends over a railroad track. This enables the hoist carrier to deliver steel directly from railroad cars to any point inside the building served by the bridge. Because of this feature and the fact that heavier bundles are handled, a saving of about 2 hours unloading time is made per 50-ton car of steel, over their former method which employed a 3-ton hoist.

Obviously with total savings running in the neighborhood of $5,000 yearly, it did not take long for this Tramrail installation to pay for itself.

GET THIS BOOK!

BOOKLET No. 2008. Packed with valuable information. Profusely illustrated. Write for free copy

CLEVELAND TRAMRAIL DIVISION
THE CLEVELAND CRANE & ENGINEERING CO.
3261 EAST 284th ST. *WICKLIFFE, OHIO*

CLEVELAND TRAMRAIL
OVERHEAD MATERIALS HANDLING EQUIPMENT

likes EASY KNIFE ADJUSTMENT

Series No. 408 Steelweld Pivoted Blade Shear for metal up to 8' x [illegible]". Note how easy long plates can be sheared by use of the 8-foot squaring arm and electric foot switch.

The easy knife clearance adjustment is one of the features that Johnston & Chapman Co., Chicago, greatly appreciates about their Steelweld Shear. Since they produce perforated metal of various thicknesses, which must have sharp, burrless edges, it is essential that the knives always be set with the right clearance to make the best possible cuts.

This company has had over 50 years of experience in shearing. They point out that if the knife clearance is too much, light gauge metals will bend, and if too close, a shear is unnecessarily heavily loaded and the knives dull rapidly.

The knife gap of their Steelweld Shear is adjusted in a few seconds by simply turning the crank conveniently located on the right end frame. The ease and simplicity of this adjustment is impressive when compared to other shears which require the entire bed be moved and gap be set by feeler gauges.

Johnston & Chapman supply perforated metal for all sorts of purposes, including screening for coal and for television equipment. Their shear is used for cutting mild steel, stainless steel, brass and other metals from 28 gauge to ⅜ inch thick.

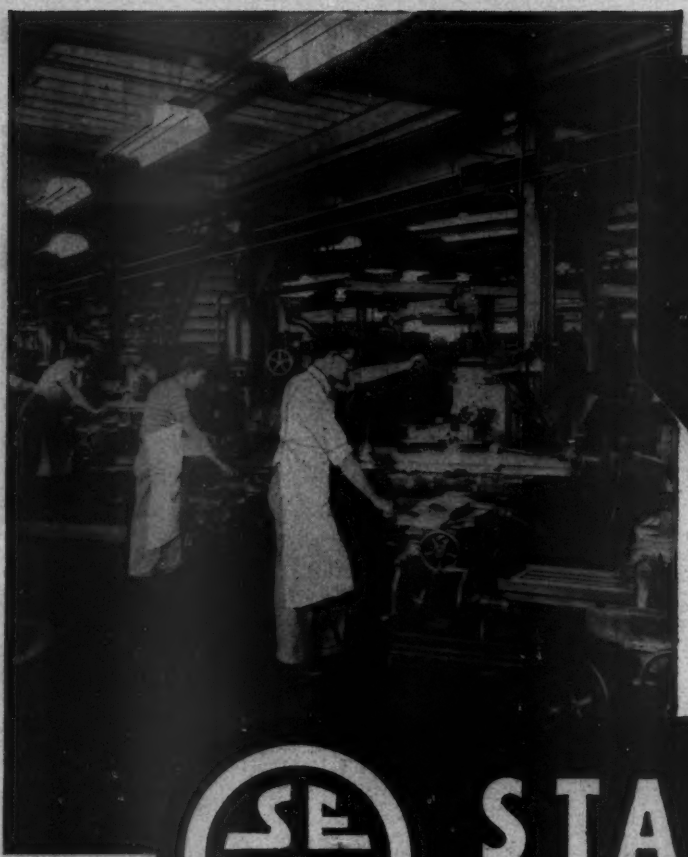
GET THIS BOOK!

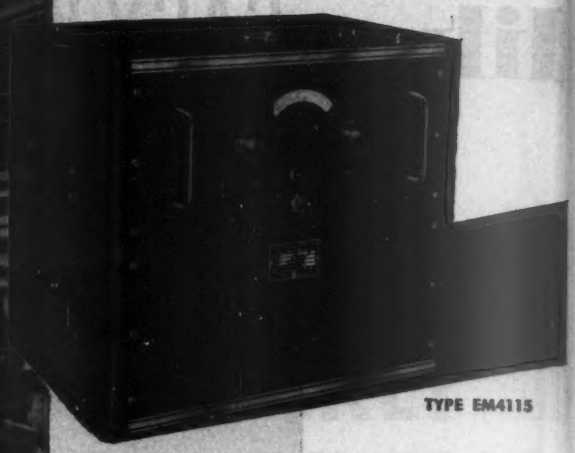
CATALOG No. 2011 gives construction and engineering details. Profusely illustrated.

THE CLEVELAND CRANE & ENGINEERING CO.

3223 East 282nd St. Wickliffe, Ohio

STEELWELD PIVOTED BLADE SHEARS



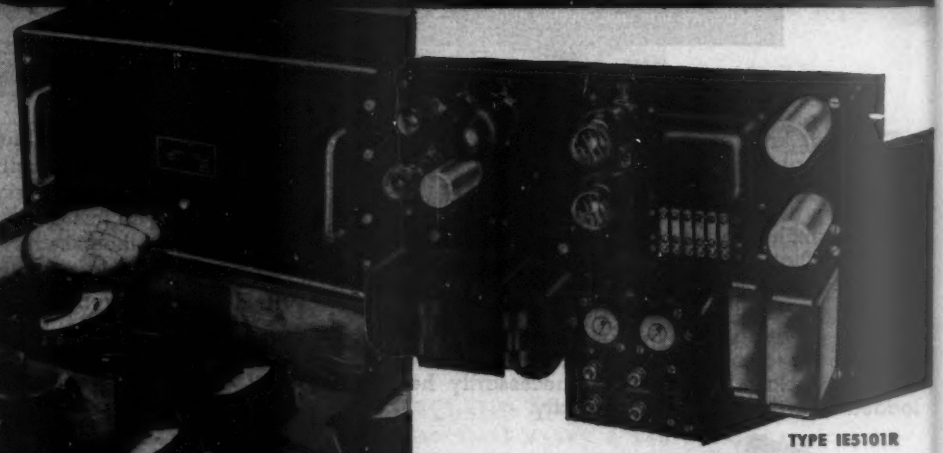


TYPE EM4115

TYPE EM (Electromechanical)

Features zero waveform distortion, high efficiency, insensitivity to magnitude and power factor of load, no critical adjustments. Has no effect on system power factor.

SE CO STABILINE VOLTAGE REGULATORS



TYPE IE5101R

TYPE IE (Instantaneous Electronic)

Completely electronic, instantaneous in action, with no moving parts. Output voltage held to ± .1% for line variations; to ± .15% for load changes.

IN THE LABORATORY, where constant voltage is a necessity for product development and analysis, STABILINE voltage regulators assure maximum performance of electrical instruments.

TESTING requires constant voltage to assure that products manufactured for specific applications will perform as rated. STABILINE voltage regulators guarantee exacting test results.

PRODUCTION is on the increase, equipment is working overtime. STABILINE voltage regulators are required to get the maximum from operating equipment, to give full life to motors and lighting, to lengthen tool life, and to cut maintenance and replacement costs.

MAINTAIN CONSTANT VOLTAGE
...regardless of line or load changes

STABILINE Automatic Voltage Regulators deliver a constant output voltage regardless of variations in input voltage or load current. This control is vital to laboratories, production, testing and inspection — all departments where precision performance is demanded. Two basic types of STABILINES are available. Type IE (Instantaneous Electronic) is completely electronic, instantaneous in action, with no moving parts. Waveform distortion does not exceed 3%. Output voltage is held to within ± 0.1 of 1% for wide line variations; to within ±0.15 of 1% for any load current change or power factor change from lagging .5 to leading .9. Type EM (Electromechanical) consists of an electronic detector circuit controlling a motor-driven POWERSTAT variable transformer which feeds a buck-boost auxiliary transformer. Inherent characteristics include zero waveform distortion, insensitivity to magnitude and power factor of load, adjustable output voltage, no effect on system power factor and no critical adjustments. Both types are offered in numerous models and ratings. There's a STABILINE for every application. Technical data and bulletins sent on request. Use coupon below.

THE SUPERIOR ELECTRIC CO.
BRISTOL, CONNECTICUT

THE SUPERIOR ELECTRIC CO., 1402 CHURCH STREET, BRISTOL, CONNECTICUT.

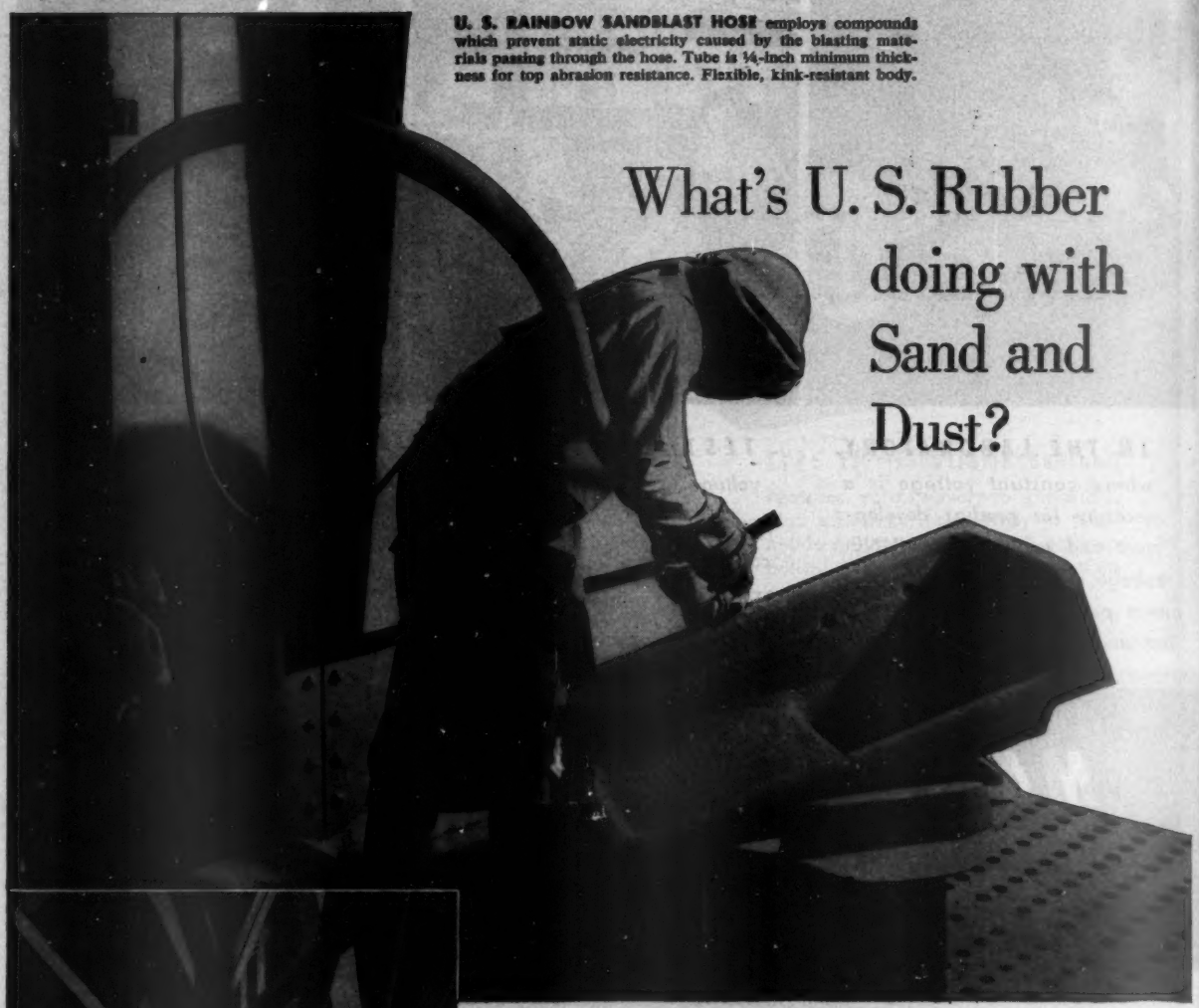
- ☐ Please send me Bulletin S351 on STABILINE Automatic Voltage Regulators.
- ☐ Keep me on your mailing list.
- ☐ Have a SECO field engineer call.

My Name _____

Company Name _____

Company Address _____

City _____ Zone_____ State _____



U. S. RAINBOW SANDBLAST HOSE employs compounds which prevent static electricity caused by the blasting materials passing through the hose. Tube is ¼-inch minimum thickness for top abrasion resistance. Flexible, kink-resistant body.

What's U. S. Rubber doing with Sand and Dust?

U. S. DUST CONVEYING HOSE will withstand the severe action of various abrasive particles conveyed through blower or suction systems. Exceptionally light and flexible. Resistant to fumes and moisture.

"U. S." technicians are constantly developing new types of hose to meet new specifications, new conditions in conveying sand and dust.

When you specify U.S. Rubber Hose, you may be sure that your investment will bring you the maximum return in trouble-free performance, in operating life and in economical service.

The research and design staff of United States Rubber Company is always at your service on hose problems. Write to address below.

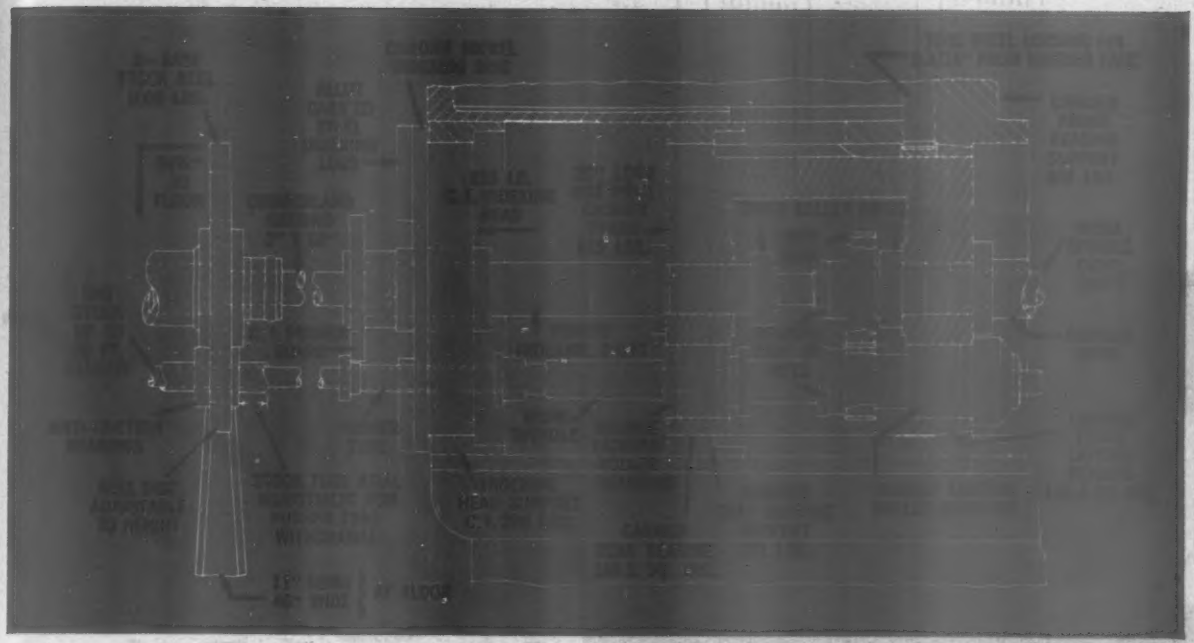
PRODUCTS OF

U.S. RUBBER

SERVING THROUGH SCIENCE

UNITED STATES RUBBER COMPANY

MECHANICAL GOODS DIVISION • ROCKEFELLER CENTER, NEW YORK 20, N. Y.



FIRST THINGS COME FIRST

Upon the Spindle Carrier of an "Automatic" falls the responsibility of accurately presenting and holding the work to — and in contact with — the tools. The basic design of the Carrier is obviously of first importance in the protection of the work spindles from the strain of heavy cuts and weight of the bar stock. Then, in proportion to the Carrier's ability to handle the full load is the importance of any supplementary facility that shares the load.

1. **The 1½" Six Spindle CONOMATIC CARRIER gives better support to the work spindles under heavy loads.**

The thick, heavy ribs resist strain. The tapered front bearing and the spindle drive gears are within 3" and 9¼", respectively, of the collet faces. The wider spaced bearings give better alignment and load distribution. The Carrier is free of Cross Slide positive stop pressure.

2. **The entire INDEXING MECHANISM is supported by the Top Bed as well as the Base. There are fewer wearing parts.**

The Indexing Head takes the brunt of the indexing load. It is supported by the short frame member midway between the Carrier and the Stock Reel. It is joined to the latter by strong center shafts.

3. **The STOCK REEL is designed to handle longer and heavier loads.**

The two Stock Reel Bases are independent of the machine and relieve it of the heaviest part of the bar load during the cutting and indexing movements. Adjustable alignment gives freer stock-feed action.

Buyer's Comparison Chart will guide you to full information

A Comparison of ALL Automatics is in Favor of Cone

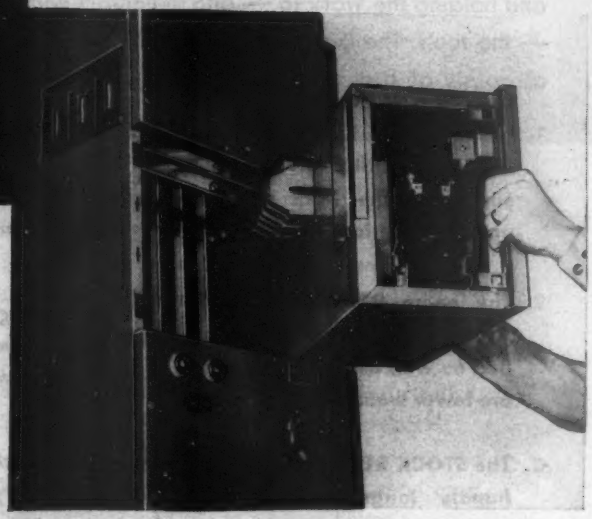
Conomatic

CONE AUTOMATIC MACHINE COMPANY, INC.
WINDSOR, VT., U.S.A.

Announcing

Centr-A-Power

. . . custom-built . . . pre-engineered



New Features Save Floor Space, Speed Up Wiring, Facilitate Operation

LESS FLOOR SPACE NEEDED

Compact trough design allows more troughs to be used in a given area of floor space.

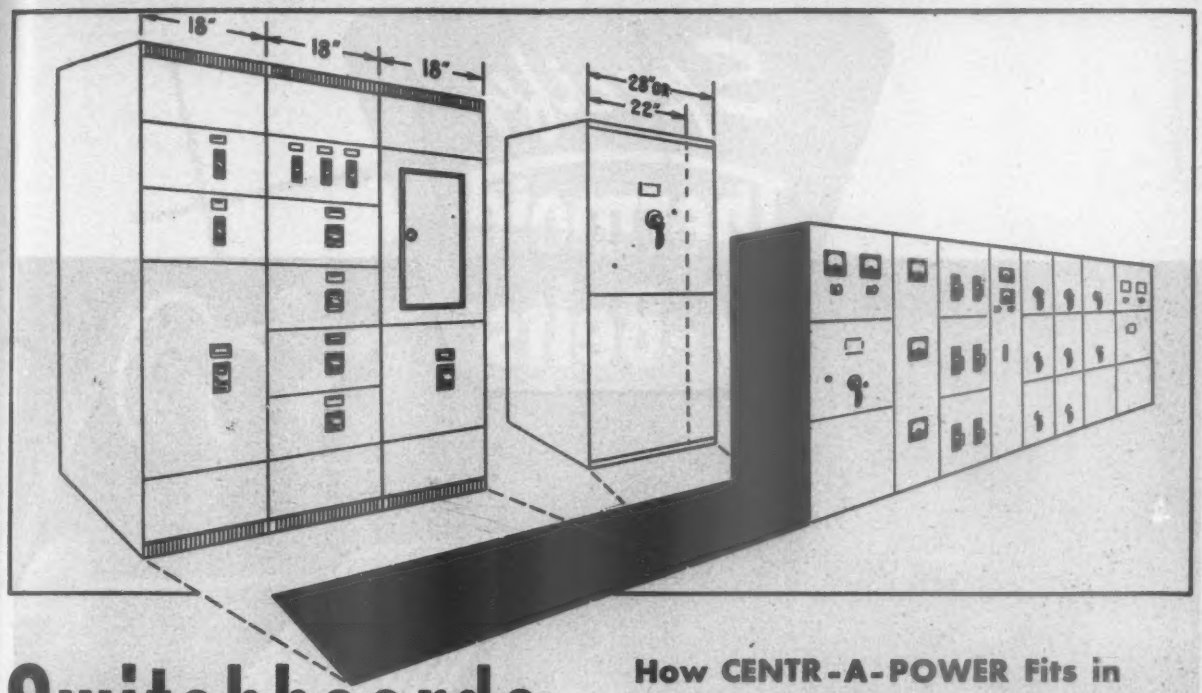
LOTS OF ROOM FOR WIRING

Generous (4 x 8 in.) wiring gutter makes wiring easier —can be accomplished with units in the trough—and allows use of over-size cable on long runs, keeping voltage drop low.

ACCESSIBLE FROM FRONT

CENTR-A-POWER Switchboards are completely accessible from the front, permitting aisle, back-to-back, "L" and "U" installations, further saving floor space.

TRUMBULL'S TRAINLOAD OF NEW PRODUCTS



Switchboards

. . . at money-saving prices

To save you money on installation time and maintenance costs, Trumbull has designed a new type of switchboard for complete low voltage (600 V and under) switching requirements. Because of pre-engineering and standardization, you can now have the highest quality construction at the lowest possible cost. Here are some of the features:

Pre-fabricated, rigid steel troughs can be placed in any arrangement to provide a completely dead-front, totally-enclosed switchboard. Wiring gutter design is such that load wiring is isolated from incoming load bus. Compact switch or breaker units, called CENTR-A-PLUGS, are easily mounted or removed. A quick-clip attachment saves time in installation, inspection and maintenance. Self-aligning latches replace bolts and nuts. Positive connection to bus bars is assured by use of spring-loaded, reinforced stabs. Each CENTR-A-POWER unit self-contained and electrically isolated from adjacent units.

How CENTR-A-POWER Fits in with Your Present Rigid Type Switchboard Equipment

CENTR-A-POWER is made from three standard troughs, all 90 in. high. At left is unit type CENTR-A-POWER with 18 in. trough; it handles fusible switches through 200 amp. and circuit breakers through 600 amp. Two standard section troughs are indicated in the center. Type A is 22 in. wide, handles 400 and 600 amp. fusible switches. Type B is 28 in. wide, handles fusible switches through 1200 amp. and circuit breakers through 1600 amp.

Unit-Type Troughs (18 in.) are furnished assembled or unassembled. Large standard sections are furnished assembled only.

ASK ABOUT TRUMBULL CENTR-A-POWER CONTROL CENTERS

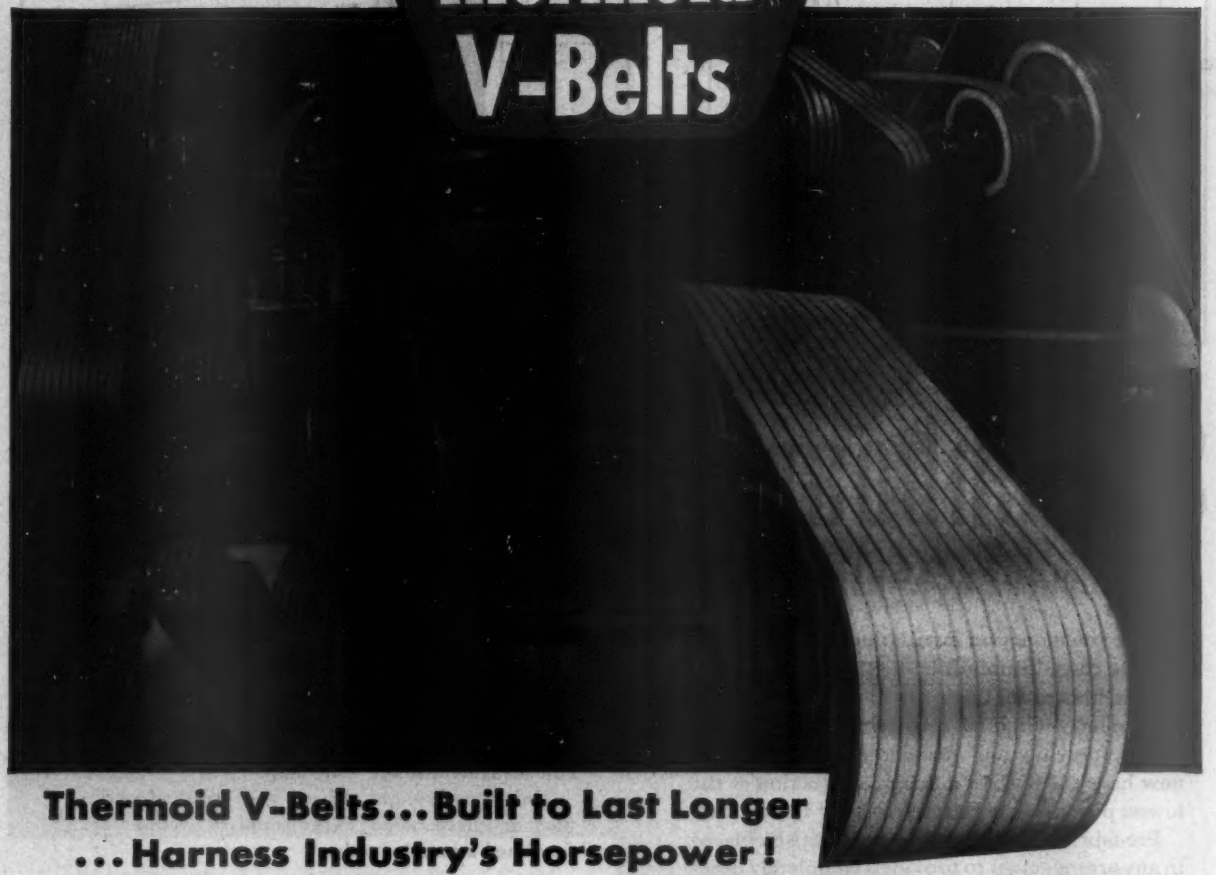
which are of similar construction and line up mechanically and electrically with CENTR-A-POWER Switchboards.

New Free Bulletin—Address The Trumbull Electric Manufacturing Company, Plainville, Conn. Ask for Bulletin TEB-3.

TRUMBULL (T) ELECTRIC

TRUMBULL'S TRAINLOAD OF NEW PRODUCTS

Specify Thermoid V-Belts



Thermoid V-Belts... Built to Last Longer ...Harness Industry's Horsepower!

From the smallest fractional horsepower size to the largest multiple V-Belt . . . Thermoid top-quality serves the needs of every industry. Thermoid V-Belts mean longer-than-average wear, maximum power transmission without slippage and lowest over-all operating costs.

Thermoid V-Belts are specially impregnated to withstand excess moisture . . . abrasion . . . acidity . . . all those elements that hasten belt deterioration. *They are prestretched to insure perfect operation without adjustments.*

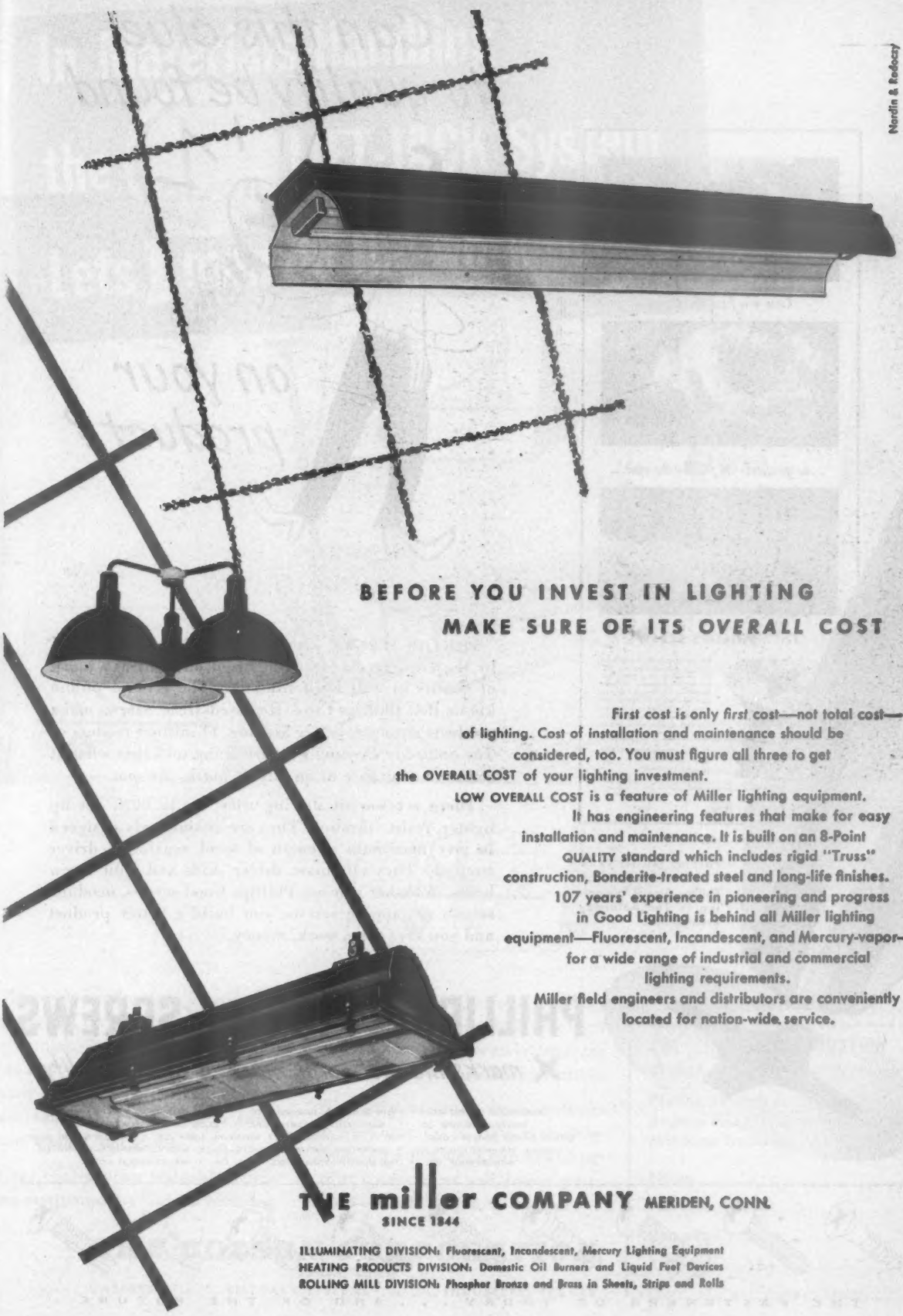
For smooth, efficient performance . . . for ability to absorb repeated shock loads . . . for lowest cost per hour . . . specify Thermoid V-Belts. Call your nearest Thermoid Distributor today. He has a complete range of sizes available to meet your requirements. And for your special belt problems, Thermoid Field Representatives are always available to help you select the right belt for the job.

It will pay you to *Specify* Thermoid

Thermoid Quality Products: Transmission Belting • F.H.P. and Multiple V-Belts • Conveyor Belting • Elevator Belting • Wrapped and Molded Hose • Molded Products • Industrial Brake Linings and Friction Materials.

Thermoid Company

Main Offices and Factory • Trenton, N. J., U. S. A.
Western Offices and Factory • Nephi, Utah, U. S. A.
Industrial Rubber Products • Friction Materials • Oil Field Products



Nordin & Redacy

BEFORE YOU INVEST IN LIGHTING MAKE SURE OF ITS *OVERALL* COST

First cost is only *first* cost—not total cost—of lighting. Cost of installation and maintenance should be considered, too. You must figure all three to get the OVERALL COST of your lighting investment.

LOW OVERALL COST is a feature of Miller lighting equipment. It has engineering features that make for easy installation and maintenance. It is built on an 8-Point QUALITY standard which includes rigid "Truss" construction, Bonderite-treated steel and long-life finishes.

107 years' experience in pioneering and progress in Good Lighting is behind all Miller lighting equipment—Fluorescent, Incandescent, and Mercury-vapor—for a wide range of industrial and commercial lighting requirements.

Miller field engineers and distributors are conveniently located for nation-wide service.

THE miller COMPANY MERIDEN, CONN.
SINCE 1844

ILLUMINATING DIVISION: Fluorescent, Incandescent, Mercury Lighting Equipment
HEATING PRODUCTS DIVISION: Domestic Oil Burners and Liquid Fuel Devices
ROLLING MILL DIVISION: Phosphor Bronze and Brass in Sheets, Strips and Rolls

Can you find the clue...
...to quality? X marks the spot...
Yes! a PHILLIPS SCREW
It's easy to tell whether a product has been assembled with engineered right-ness at vital fastening points. Just look for Phillips Screws. You'll know them by the identifying X formed by the cross-recess on the head of each screw. It's your clue to quality construction on the widest range of products, from television sets to aircraft.
PHILLIPS Cross-Recessed-Head SCREWS
on sale at hardware, automotive and mill supply outlets

Part of the series of advertisements on Phillips Screws appearing in The Saturday Evening Post.

Can this clue to quality be found

on your product?

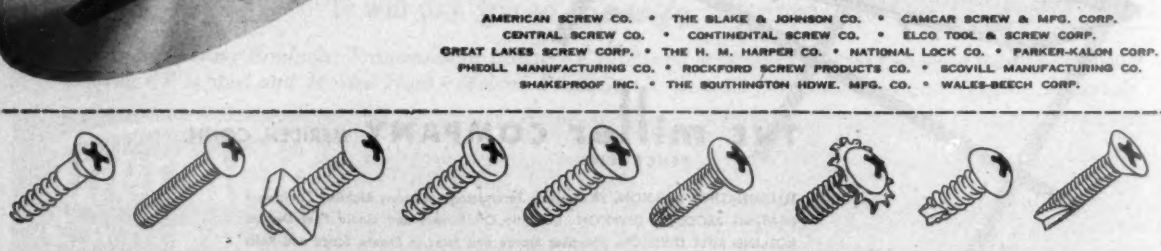
PHILLIPS SCREWS, with their identifying X formed by the cross recess, are recognized on sight as a mark of quality in well built products. The general public knows that Phillips Cross-Recessed-Head Screws make products stronger, better looking. 14 million readers of *The Saturday Evening Post* are being told that when it comes to assurance of quality, *X marks the spot.*

These screws cut driving time up to 50%, set up tighter, resist vibration. They are distinctively designed to give maximum strength of head, maximum driver strength. They eliminate driver skids and split screw heads. Whether you use Phillips wood screws, machine screws or tapping screws, you build a better product and you save time, work, money.

PHILLIPS *Cross-Recessed-Head* SCREWS

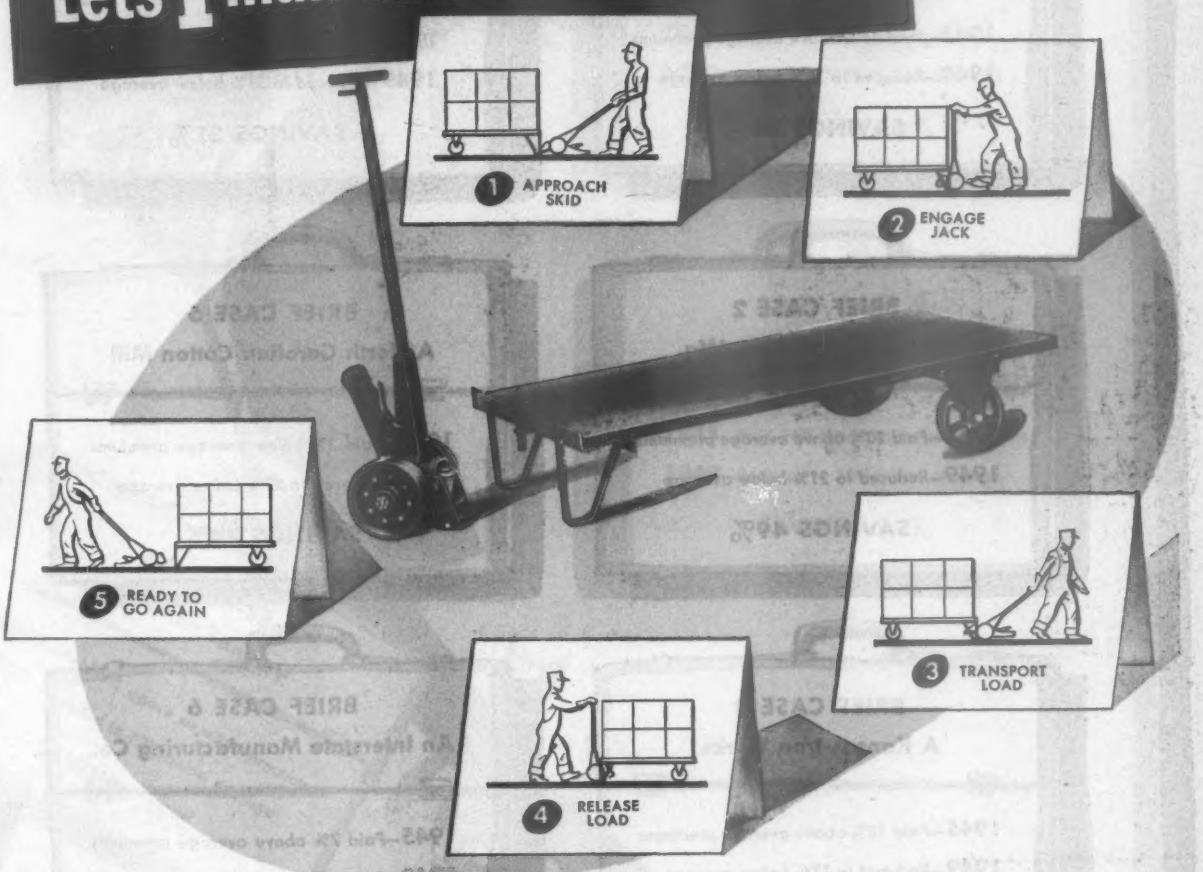
X marks the spot... the mark of extra quality

AMERICAN SCREW CO. • THE BLAKE & JOHNSON CO. • CAMCAR SCREW & MFG. CORP.
CENTRAL SCREW CO. • CONTINENTAL SCREW CO. • ELCO TOOL & SCREW CORP.
GREAT LAKES SCREW CORP. • THE H. M. HARPER CO. • NATIONAL LOCK CO. • PARKER-KALON CORP.
PHEOLL MANUFACTURING CO. • ROCKFORD SCREW PRODUCTS CO. • SCOVILL MANUFACTURING CO.
SHAKEPROOF INC. • THE SOUTHINGTON HDWE. MFG. CO. • WALES-BEECH CORP.



THE FASTENERS OF TODAY . . . AND OF THE FUTURE

In Materials-Handling the Colson LIFT-JACK System Lets 1 man do the work of 2



Through production, in and out of storage, on and off freight cars or trucks, Colson Lift-Jacks with wood or steel semi-live skids can easily double the efficiency of conventional hand trucks. You save time, money and space.

Other cost-saving materials-handling equipment by Colson includes drum and barrel trucks, platform trucks, hand trucks and precision built roll-easy wheels and casters for every type of industrial application.

Why not consult a Colson engineer to see how up to date materials-handling equipment can speed up your operations and lower your costs—no obligation, of course.

THE COLSON CORPORATION
ELYRIA, OHIO
CASTERS . . . . LIFT-JACK SYSTEMS . . . . INDUSTRIAL TRUCKS

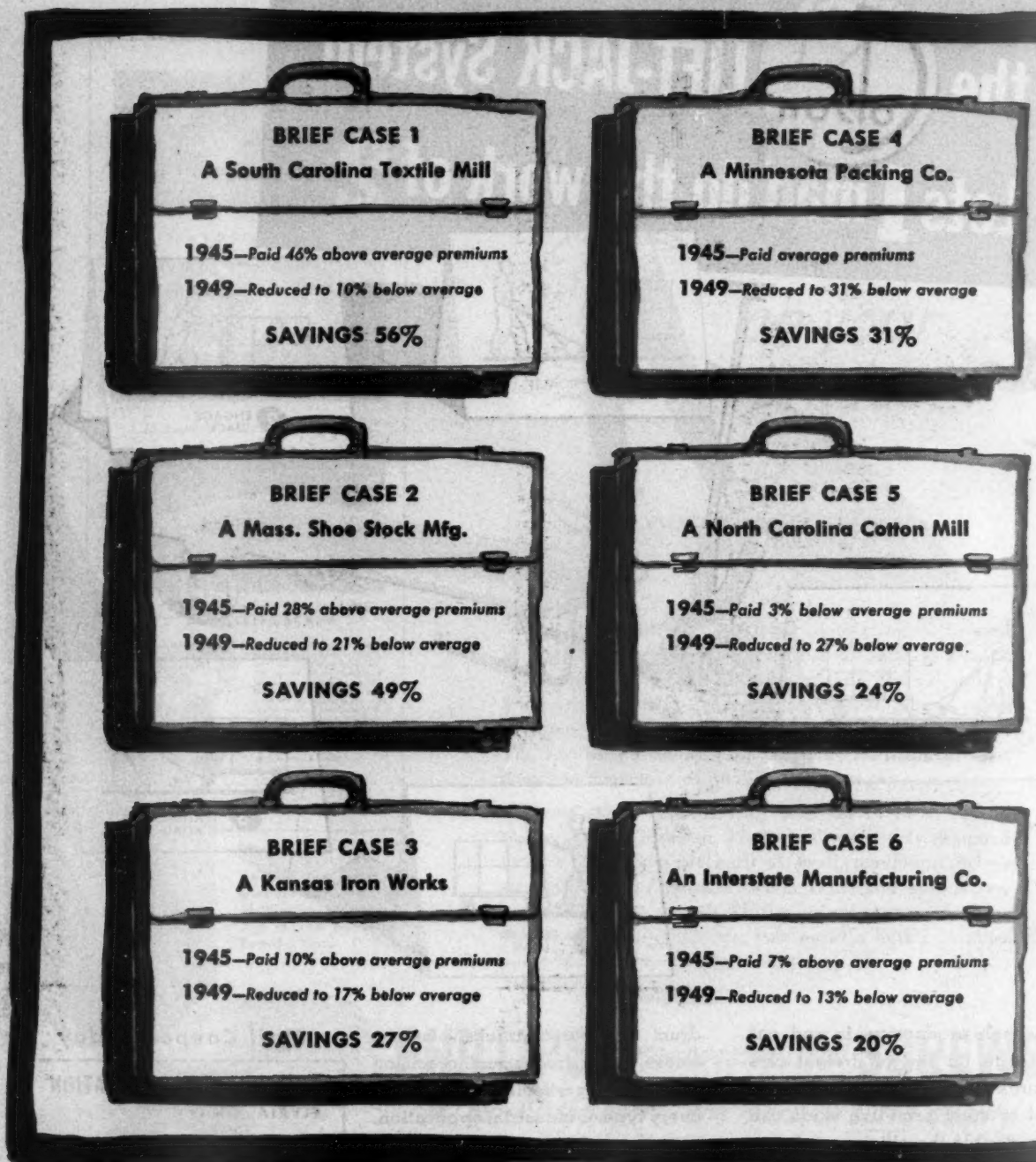
Mail Coupon Today

THE COLSON CORPORATION
ELYRIA, OHIO

Please send free copy of 56 page catalog "Colson Materials-Handling Trucks".

Name.....
Position.....
Company.....
Address.....
City.....Zone.....State.....

THE NINE BRIEF



This is the fastest way we know of to show you how American Mutual can step into a company and help reduce unnecessary accident hazards and unnecessary high insurance premiums. In these days of rising costs and inflation, isn't this special money-saving service worth looking into . . . especially when you consider that you also get an opportunity to make important *extra savings* through dividends!

AMERICAN MUTUAL ... *the first American liability insurance company*

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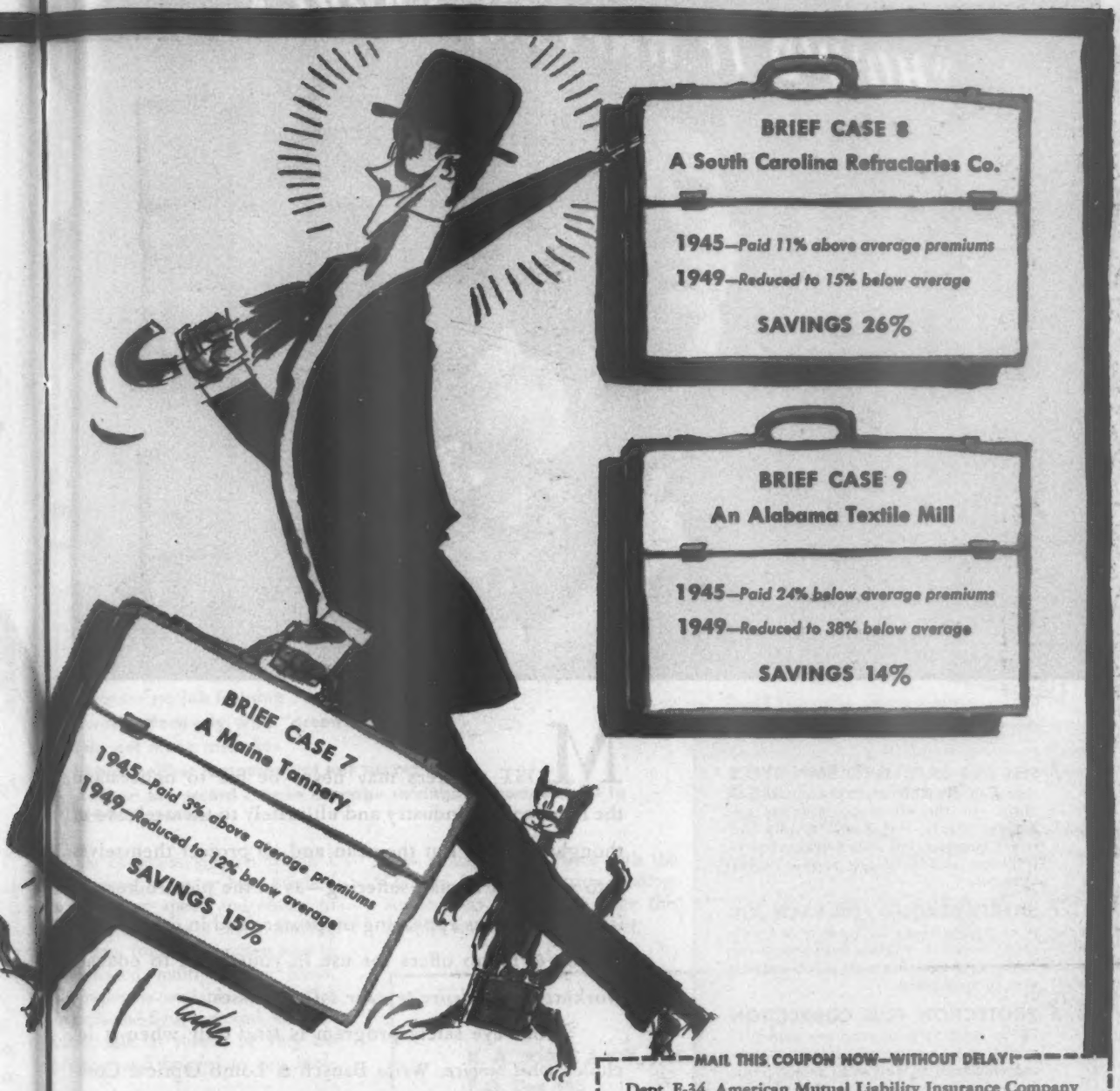
CASES . . . OF MR. FRIENDLY



MAIL THIS COUPON NOW—WITHOUT DELAY!

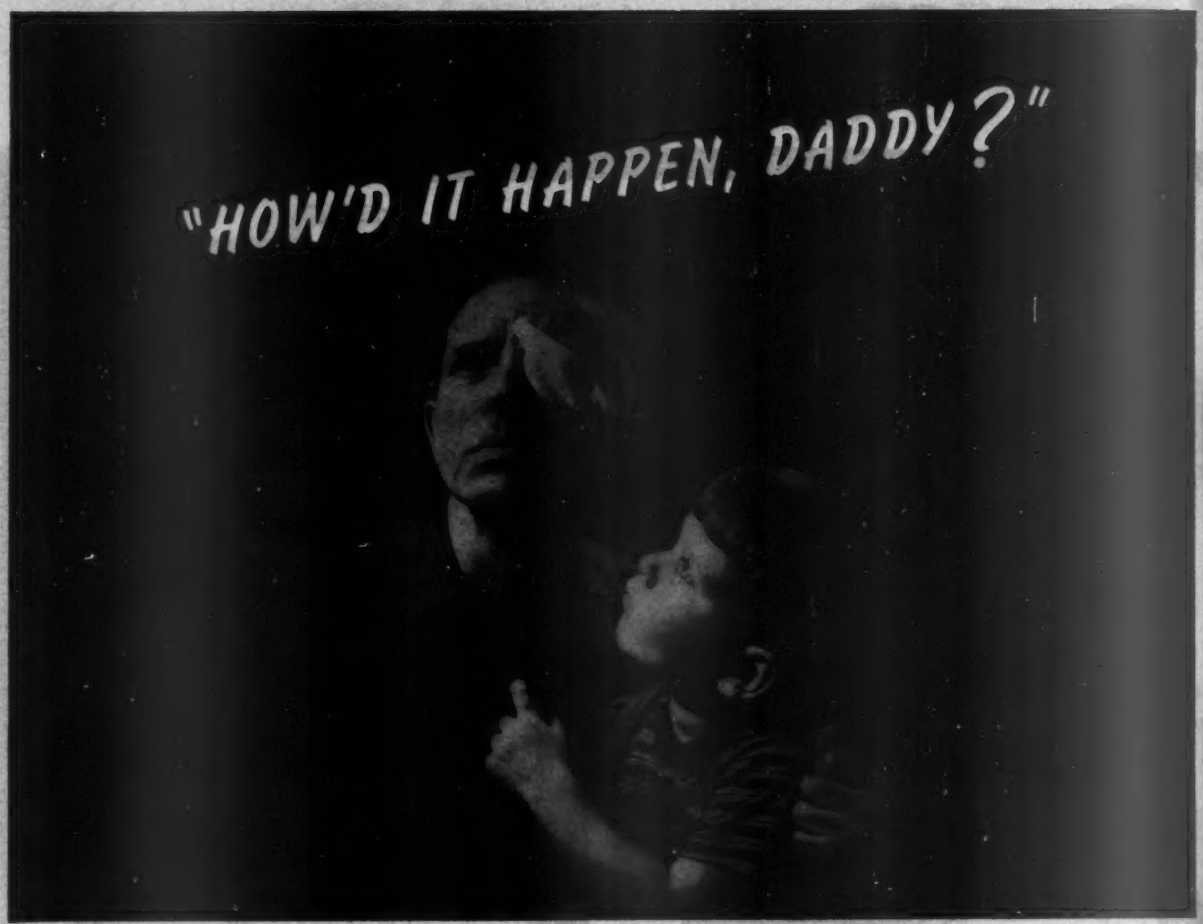
Dept. F-34, American Mutual Liability Insurance Company
142 Berkeley Street, Boston 16, Massachusetts

Without obligation, please *rush* me my *free* copy of *The All-American Plan*, showing me how to save on practically every kind of insurance, except life. Also, a most helpful, free, illustrated 98-page book, *Foremanship and Accident Prevention in Industry.*

*Name*_____

*Street*_____

*City*_____ *State*_____



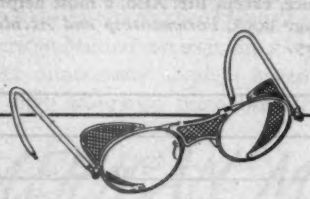
1 SELL EYE SAFETY TO EMPLOYEES
Ask your distributor's representative to show you the kit of posters, pay envelope inserts, PA system scripts and other material that sells workers forcefully on *desire to use* proper safety eyewear.

2 SAFETY GLASSES FOR EACH JOB
A complete range of Bausch & Lomb safety eyewear, engineered to meet the most rigid tests for each job classification in your plant.

3 PROTECTION *PLUS* CORRECTION
For at least 50% of your workers prescription lenses are necessary to working efficiency as well as to safety. Your B&L distributor offers prompt prescription service on all types of industrial eyewear.

MOST workers may never be led to understand the huge cost to industry and ultimately to themselves—of thoughtlessness. But they can and *do* project themselves into scenes of human suffering—as in the picture here. It is one of a series appearing on posters and in other forms Bausch & Lomb offers for use in your plant to educate workers in the *desire to wear* safety glasses.

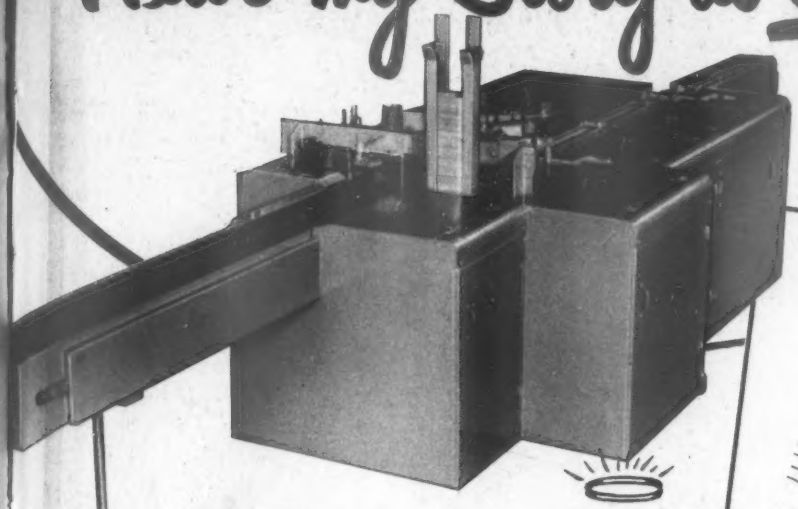
Your eye safety program is *total* only when it includes *total service.* Write Bausch & Lomb Optical Company, 650-2 St. Paul St., Rochester 2, New York, for complete information on a total eye service.

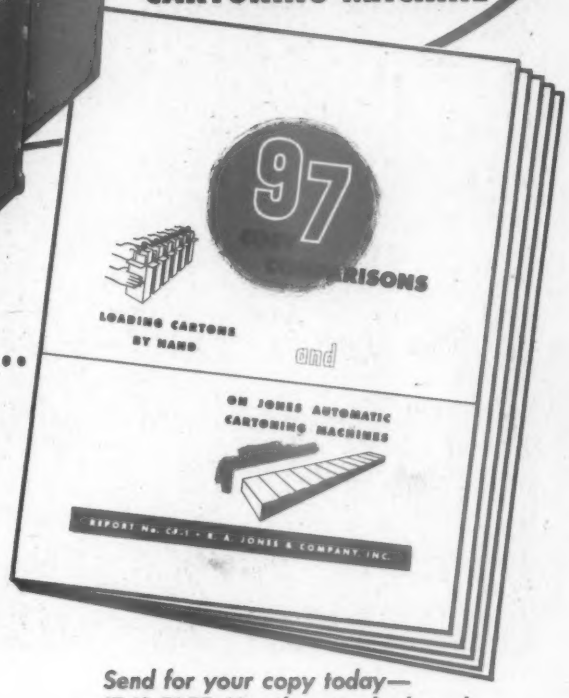


BAUSCH & LOMB *Safety Eyewear*

"Hear my Story as I tell it!"

by the JONES FULLY AUTOMATIC CARTONING MACHINE





Without wearing a halo...

I am probably the most nearly ideal employee your business could have!

And with due modesty I state some facts:

I do not strike or lay off
I indulge in no sit-downs or work stoppages
I am never absent or tardy
I never have a hang-over
I expect no vacation or sick leave
I require no job training
I work effectively with "green help"
I do not make mistakes
I have neither temperament nor nerves
And on my record I make average savings of from $36.33 to $189.40 per day.

Of the countless jobs on which I am working, 97 have been studied to record my speed and ability to handle every type of carton loading operation, from the simplest load to complicated multiple-piece loads. This report is available in a booklet—a facts-and-figures record, without selling talk. It should be very interesting and helpful to any business which has problems with the "human factor" in carton loading. As long as the supply lasts this booklet is available on request.

Send for your copy today—
IT IS FREE. Use the attached card.
Then, if you want further information about me, that will be sent promptly and without obligation.

Cordially yours,

Jones fully automatic constant motion Cartoning Machine

R. A. & COMPANY, INC.

P. O. BOX 485
CINCINNATI, OHIO

R. A. JONES & CO., INC.
P.O. Box 485
Cincinnati, Ohio

Gentlemen:

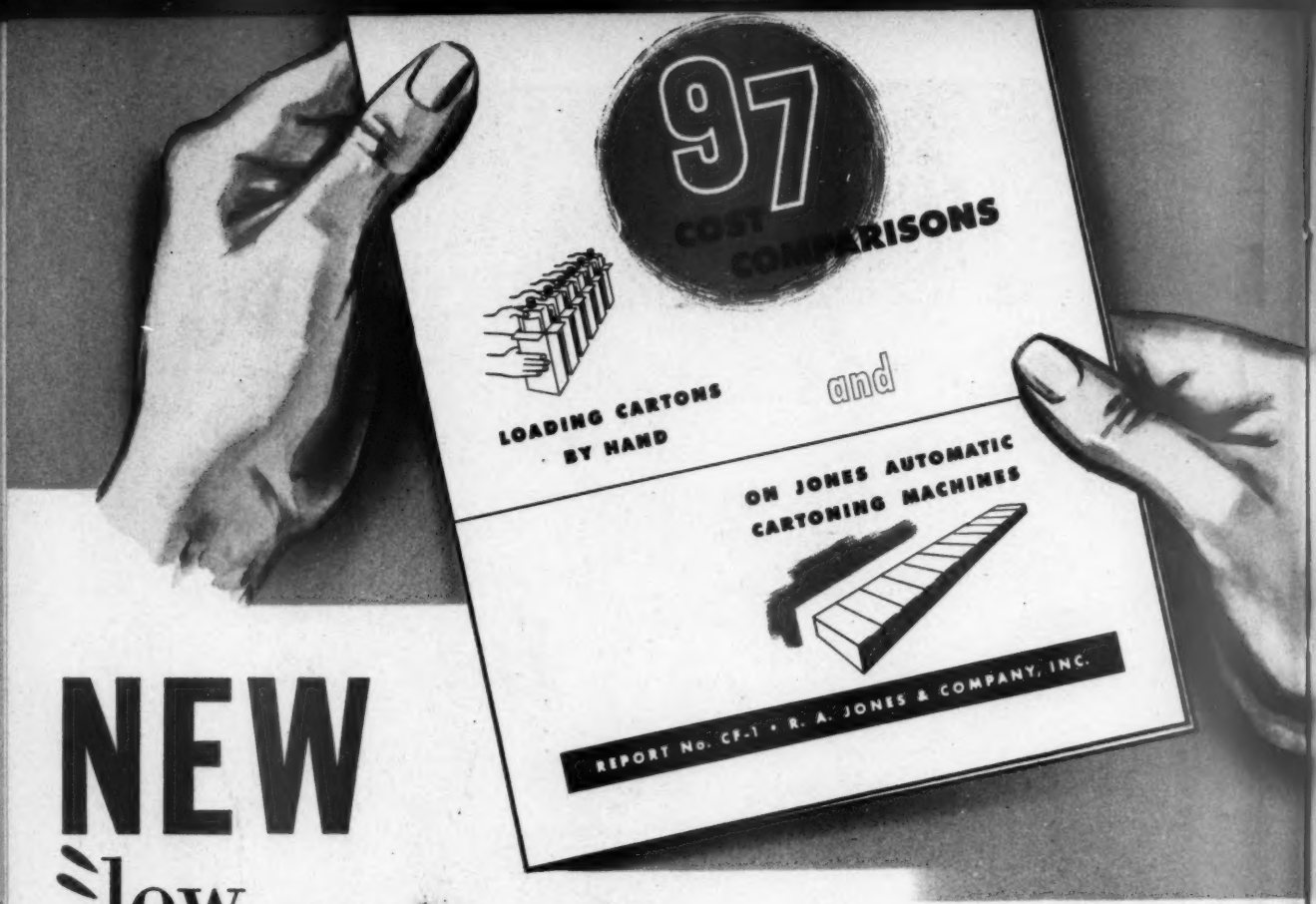
Send, without obligation, a copy of the booklet "97 Cost Comparisons."

Name.....**Title**.....

Company.....

Address.....

City.....**Zone**.....**State**.....

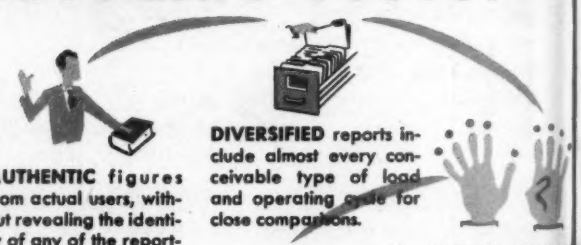


NEW "low-down" ON CARTONING COSTS!

Scores of users of Jones Carton Loading Machines have given us the cost of hand loading their products as compared with automatic cartoning. The various loads or products are described, enabling you to compare your cartoning costs on similar operations.

This group of post-war Jones Cartoners is saving an average of $115.33 per day per machine!

If you'd like to check your cartoning cost "batting average" against others in your league, ask for your copy of this report, which will be sent promptly.



AUTHENTIC figures from actual users, without revealing the identity of any of the reporting concerns.

DIVERSIFIED reports include almost every conceivable type of load and operating cycle for close comparisons.

9 GROUP STUDIES are classified by types of operations, permitting direct comparison with similar operations.

NO CHARGE is made for this report. We are glad to send a copy to anyone who is interested.

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R. A. JONES & COMPANY, INC.

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R. A. & COMPANY, INC

P. O. BOX 485
CINCINNATI, OHIO

save time and labor with Stanley "Magic Doors"

Speed of production depends partly on the speed materials and parts move in your plant. By opening and closing doors automatically, Stanley Magic Doors keep materials flowing smoothly, swiftly, safely, efficiently.

Stanley photoelectrically controlled operators (1) open doors automatically when you approach, (2) hold them open, (3) close them after you pass through. Damaging batter and clatter are eliminated. Room temperatures and humidity are controlled. Precious man-hours are saved . . . handling costs are reduced.

Fill in the coupon below and get all the facts. Find out how Stanley Magic Door operators can go to work on existing doors in your plant.

STANLEY MAKES COMPLETELY AUTOMATIC DOOR CONTROLS FOR SWINGING, FOLDING OR SLIDING DOORS

STANLEY

Reg. U. S. Pat. Off.

DOOR CONTROLS

"The Magic Door"

STANLEY MAGIC DOORS

The Stanley Works, Magic Door Division
240 Lake Street, New Britain, Conn.

☐ Kindly send me full information on Stanley Magic Doors.
☐ Have your representative call.

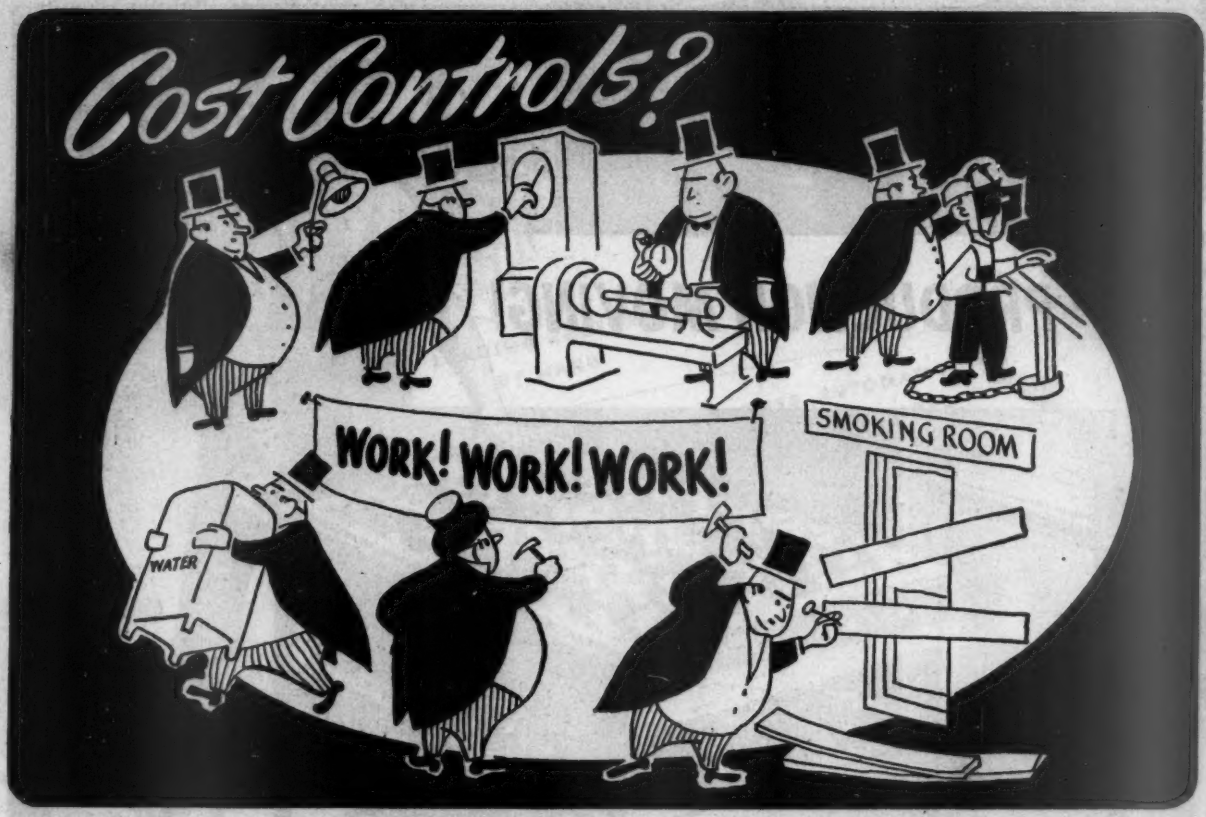
Your Name.....

Firm's Name.....

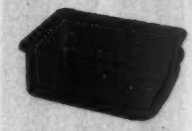
Street.....

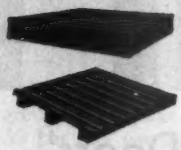
City..... State.....

HARDWARE • TOOLS • ELECTRIC TOOLS • STEEL STRAPPING • STEEL



There are many ways of lowering production costs — but, POWELL *PROVEN* MATERIAL HANDLING EQUIPMENT PROVIDES MAXIMUM SAVINGS





TRYING to operate your plant at its greatest efficiency? Then check your materials handling operation. In the average plant, handling of materials and products amounts to more than a third of total product cost. New methods and techniques and Powell ***Job Designed*** containers have slashed excessive costs to a fraction.

For more than 30 years Powell has designed and built the most efficient handling equipment available anywhere, because Powell designs for the job — and at standard costs. Take advantage of this experience. Call in Powell's material handling specialists. They'll be happy to look over your operation at no cost to you. Write today, or get in touch with the Powell representative nearest you. Offices in principal cities — listed in yellow pages of phone directories.

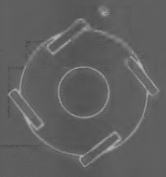
Send Inquiries to Dept 121

POWELL
PRESSED STEEL
SINCE 1920

THE POWELL PRESSED STEEL CO.
HUBBARD OHIO
ORIGINATORS OF COLD-FORMED ALL-STEEL HANDLING EQUIPMENT

DELTA
MILWAUKEE

Sealed-bearing 4-knife cutterhead



gives you
33 1/3%
faster, smoother cuts!

In addition to this big 8" jointer, Delta offers 4 other jointers and 2 saw-jointer combinations to meet every need — every budget!

New 8" Delta Crescent Jointer

— BIG Cuts (8" x ½") BIG Table (60") for BIG Work!

The best buy in the field! *Big capacity* — for 8" cuts, ½" deep rabbets. *And* above all, the exclusive 4-knife cutterhead that cuts — for 33-1/3% *faster, gives better finish! Big table* — a full 60" long for that much bigger pieces! Ask to see it in action. Convince yourself.

See how easy it is to completely equip any woodworking shop *exclusively* with Delta tools — and enjoy the extra convenience of service from one dependable source. And see the extra quality features you get at amazingly low cost in these dependable Delta tools.

Send for details — and plan to equip your shop completely with extra-value Delta tools — high in quality, low in cost!

Sold only through authorized dealers — available on easy time payments. Look for the name of your Delta dealer under "Tools" in the classified section of your telephone directory.

DELTA POWER TOOL DIVISION
Rockwell
Manufacturing Company
MILWAUKEE 1, WISCONSIN

Tear out this coupon and mail today!

Free... 6 Times a Year!

The Power Tool Journal — 12 pages packed with detailed job data, fully illustrated — handbook of time- and money-saving ideas!

Delta Power Tool Division
ROCKWELL MANUFACTURING COMPANY
6198 E. Vienna Avenue, Milwaukee 1, Wisconsin

Send me free — ☐ The Power Tool Journal — 6 times a year.
☐ Catalogs and bulletins on complete Delta line.

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Company_____

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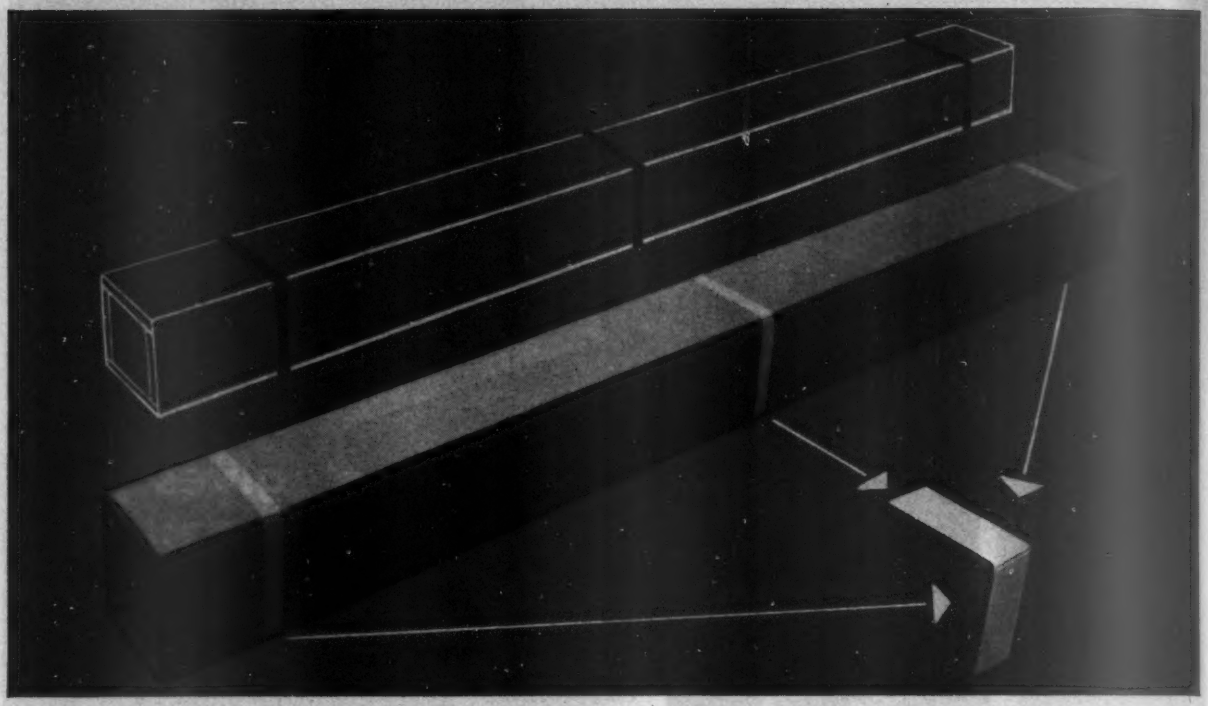
W-63



OLD AND NEW CONTAINERS show the packaging revision that slashed material and labor costs for Pyramid Mouldings, Inc. New carton, below, is secured with three short strips of new Tape-Strap.

New TAPE-STRAP Cuts Packaging Costs 50%

Pyramid Mouldings, Inc., Chicago, shipped their metal mouldings in metal-strapped wooden cases. Shipments weighed from 400 to 600 pounds and packaging was slow and expensive. Cost was about $9.00 per unit.

Then the company switched to a double wall, corrugated carton, secured with new Tape-Strap. Packaging is now easier, faster, safer. Labor savings are more than 75% and material costs have been reduced about 50%.

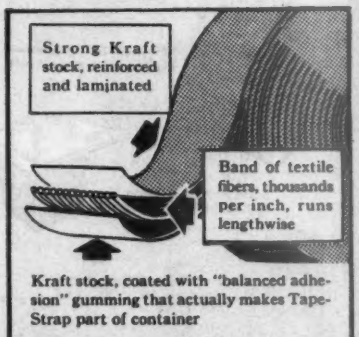
TAPE-STRAP—A NEW PACKAGING TOOL

Changing to new, tremendously strong Tape-Strap has slashed packaging costs for companies making all sorts of products, from brakes and blueprint paper to shoes and Venetian blinds.

You handle Tape-Strap as easily as ordinary gummed tape . . . but no gummed paper tape ever made even begins to approach Tape-Strap's amazing tensile strength of 180 pounds per inch of width.

You get, in Tape-Strap, a unique combination of strength; fast, safe application; and permanent sealing that makes pilferage instantly detectable. There's no pinching of the container or contents. You need no costly equipment to apply Tape-Strap. There's no disposal problem after the shipment arrives.

Perhaps your company, too, can cut packaging costs with amazing super-strong Tape-Strap.


Strong Kraft stock, reinforced and laminated
Band of textile fibers, thousands per inch, runs lengthwise
Kraft stock, coated with "balanced adhesion" gumming that actually makes Tape-Strap part of container

"SANDWICH" DESIGN and super-strength textile fibers are the secret of Tape-Strap's amazing strength.

Write for *free* sample roll, and folder that gives complete data on this new packaging tool.

MID-STATES
Gummed Paper Company
2517 So. Damen Avenue, Chicago 8, Illinois

LEADERS IN THEIR LINE

BRANCH OFFICES: New York, Philadelphia, Cleveland, Detroit, St. Louis, Los Angeles

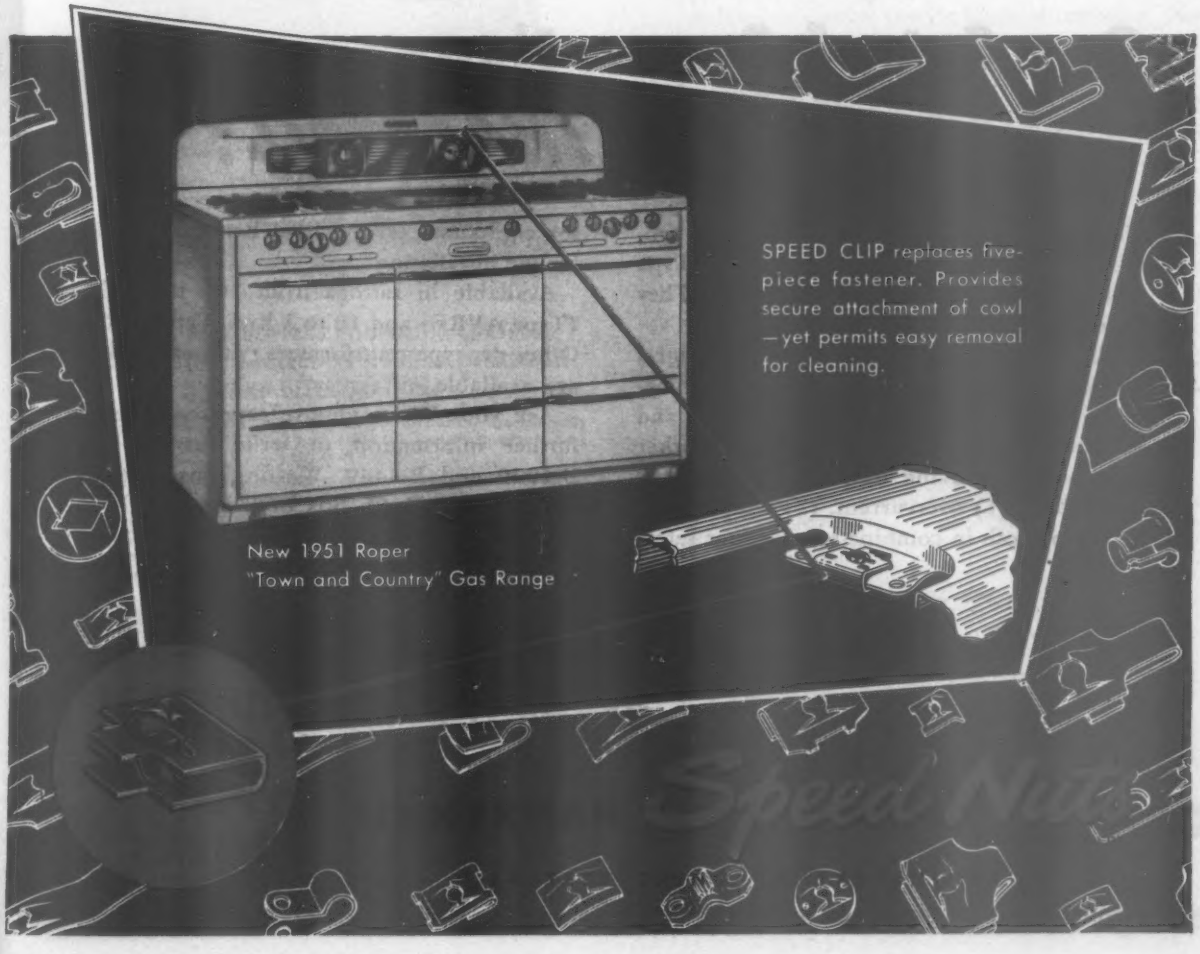
Speed Nut Savings Stories

SPEED CLIPS* help ROPER "boil down" assembly costs

● "Until recently each vent grill cowl on our ranges was attached with a five-piece fastener," reports the Geo. D. Roper Corporation, Rockford, Illinois.

"Now we are making the same attachment with a *single* SPEED CLIP! As with all 65 of the Tinnerman fasteners used on each of our ranges, the assembly savings on this new application are substantial."

Everywhere you look today you find new proof of SPEED NUT savings power. If you haven't made a recent check of your products, we will be glad to conduct a thorough Fastening Analysis. Ask your Tinnerman representative for details on this service, and write for your copy of SPEED NUT Savings Stories. TINNERMAN PRODUCTS, INC., Box 6688, Department 12, Cleveland 1, Ohio. In Canada: Dominion Fasteners Limited, Hamilton. In Great Britain: Simmonds Aerocessories, Limited, Treforest, Wales.


SPEED CLIP replaces five-piece fastener. Provides secure attachment of cowl—yet permits easy removal for cleaning.
New 1951 Roper
"Town and Country" Gas Range

YOU CAN BE SURE.. IF IT'S
Westinghouse

One Set of Connections
THAT'S ALL!

No need to install separate switches and protective devices with Westinghouse Dry-Type Transformers, Types AJRB and AVRB. They have circuit breakers built in!

It's a better installation, too. The integral breaker gives three-way protection . . . something no combination of transformer and external protectors can do. Because the breaker is located inside the transformer case, it is actuated by (1) overcurrent, (2) temperature, or (3) by both in combination. Greater safety for equipment on the line! Better protection for the installation!

Available in ratings from 100 to 15 kva (Type AVRB) and 10 to 3 kva (Type AJRB). Other dry-type transformers without breakers are available.

Ask your Westinghouse representative for further information, or write for Booklets B-4009 and B-4439. Westinghouse Electric Corporation, P. O. Box 868, Pittsburgh 30, Pennsylvania. J-70377

Westinghouse
DRY-TYPE TRANSFORMERS

These new free booklets can help you CUT CORROSION COSTS IN YOUR PLANT!

To prevent rust and other corrosion of metal—to prevent deterioration of concrete and masonry— Koppers manufactures six Bitumastic® Protective Coatings; each one of these coatings is specially formulated to control specific kinds of corrosion. Now, in one compact package, Koppers offers booklets that describe all of these coatings, and show how they can solve your plant's corrosion problems. A "Visual Index" is included, too, making it easy to find the information you want.

The factual data in these booklets will be valuable in helping you to cut plant maintenance costs. Send for a set of booklets today. Just fill out and mail the handy coupon.

HERE'S WHY KOPPERS BITUMASTIC COATINGS GIVE LASTING PROTECTION AGAINST CORROSION AND DETERIORATION:

- **Koppers Coatings, unlike maintenance paints, are specially formulated from a tar-pitch base* that is for all practical purposes impervious to water.**
- **Koppers Coatings provide a tough, impenetrable barrier to corrosive elements.**
- **Koppers Coatings provide up to 8 times the film thickness of conventional paint coatings.**
- **Koppers Coatings stop corrosion caused by moisture . . . acid fumes . . . alkaline fumes . . . corrosive soil . . . salt air . . . heat.**

** Hi-Heat Gray contains heat-resistant metallic base*

Koppers Company, Inc.
Tar Products Division, Dept. 253T
Pittsburgh 19, Pa.

Please send me without charge or obligation your booklets on corrosion prevention.

Name.....

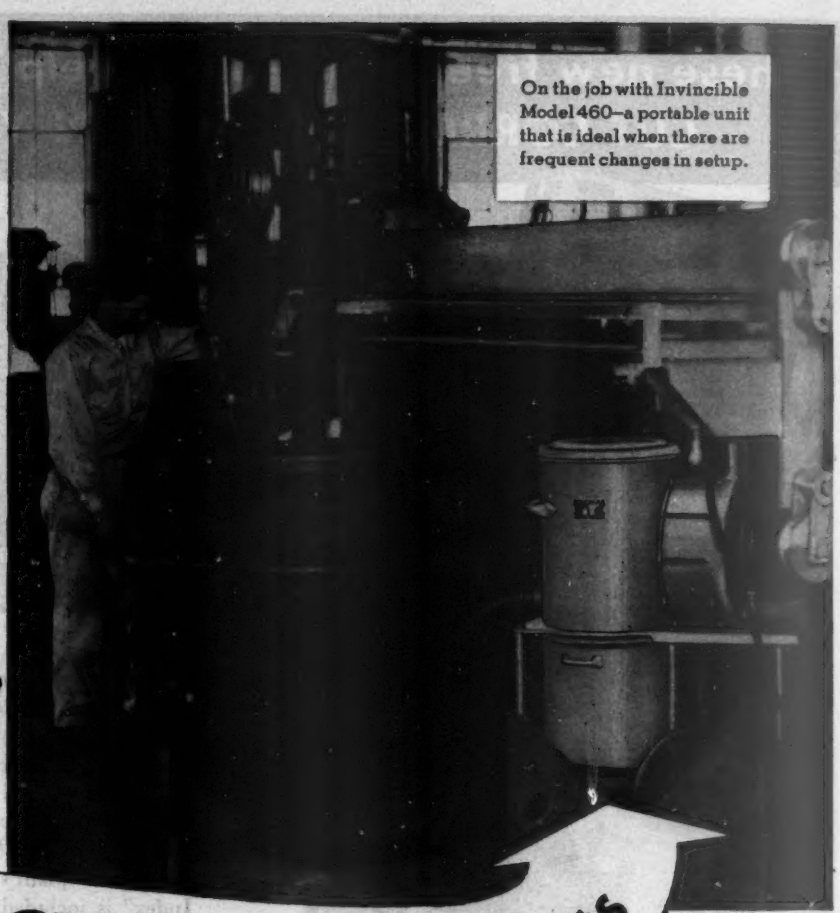
Address.....

City..... Zone..... State.....

KOPPERS **BITUMASTIC** PROTECTIVE COATINGS
REG. U.S. PAT. OFF.

SOLD THROUGH INDUSTRIAL DISTRIBUTORS

KOPPERS COMPANY, INC., Tar Products Division, Dept. 253T, Pittsburgh 19, Pa.



On the job with Invincible Model 460—a portable unit that is ideal when there are frequent changes in setup.

SALVAGE WELDING FLUX the *Modern Way*

with INVINCIBLE Recovery Units

FREE Folder on Flux Recovery
Illustrated case histories show how Invincibles save money on all kinds of installations. *Send for your copy NOW!*

On the average submerged arc welding installation, approximately 80% of the flux deposited on the weld can be reclaimed. Invincible Flux Recovery Equipment is designed especially for this particular operation. It affords the most efficient and economical way to handle the job. *Automatically,* all loose flux is recovered from the work. Fine dust and fused particles are removed. Only slag-free, dust-free, usable material is returned to the hopper of the welder in a continuous flow. The Invincible system saves costly man-hours over manual methods. It also increases production and reduces expensive rejects by eliminating fine dust (flux flour).

Thousands of Invincible Recovery Units have salvaged enough flux in a few months or even weeks to repay their cost . . . The complete Invincible line includes the correct type and size for *every* submerged arc welding job.

INVINCIBLE VACUUM CLEANER MFG. CO.
DOVER, OHIO
FOR 40 YEARS, LEADERS IN INDUSTRIAL-VACUUM EQUIPMENT

More Power Per Pound

with ARO

GRINDERS

A—*Model 7114 High Speed Grinder* . . . 26,000 r.p.m. . . . Erickson precision collet . . . weight 10 oz.

B—*Model 7105 Turbine Grinder* . . . 75,000 r.p.m. 1/64" to 1/4" shaft capacity . . . Erickson precision collet . . . weight 20 oz.

C—*Model 7015 Short Grinder* . . . 21,000 r.p.m. . . . wheel capacity 1-1/2" . . . weight 1-3/8 lbs.

D—*Model 7149 Short Grinder* . . . 17,000 r.p.m. . . . wheel capacity 2" . . . weight 2 lbs.

E—*Model 7171 2" Heavy Duty Production Grinder* . . . malleable housing . . . 18,000 r.p.m. . . . weight with guard and handle 4 lbs. 11 oz.

F—*Model 7011 Heavy Duty Grinder* . . . 4500 r.p.m. . . . 8" wheel . . . weight less wheel guard and wheel, 13 lbs. Also available 6000 r.p.m. for 6" wheel.

Ask your ARO distributor for details. Write for catalog.

The Aro Equipment Corporation, Bryan, Ohio.
Aro Equipment of Canada, Ltd., Toronto.

The BRUTE
It's BIG . . . yet weighs only 11 lbs.! Model 7200 Heavy Duty Vertical Grinder with 6" cup wheel . . . BIG POWER . . . 6000 R.P.M. . . . safety throttle.

ARO AIR TOOLS
Also . . . LUBRICATING EQUIPMENT . . . HYDRAULIC EQUIPMENT
AIRCRAFT PRODUCTS . . . GREASE FITTINGS

KAISER-FRAZER'S Plant-Communications System

RCA selected to design and install modern plant-wide sound system

When the Kaiser-Frazer Corporation decided to install a plant-wide sound system in their gigantic Willow Run plant, they started the job right by calling in RCA sound technicians.

K-F management knew that the Radio Corporation of America had designed and installed thousands of sound systems that had been "tailored" to meet the particular needs of different types of industries.

There are nearly 600 loudspeakers in the K-F plant-wide sound system. RCA sound technicians surveyed the entire plant, checking the noise level to determine the best type of loudspeakers for each area, based on the amount of noise level at the various points.

The Consolette Control Turret in the foreground provides complete and flexible control of the sound program to any or all parts of the entire plant. Facilities are installed for transcription recording and playback.

Air view of the $100,000,000 Willow Run plant near Detroit, Michigan, where Kaiser-Frazer automobile and Graham-Paige farm equipment is produced. The plant is the largest in the world under one roof.

K-F's news commentator delivers a news broadcast at noon hour to Willow Run's 12,000 employees. Executive paging, special announcements or talks can be transmitted to any or all departments.

K-F's 5200-watt audio output exceeds most commercial broadcasting stations. Shown above is the hub of this immense sound system. It permits high or low level sound to be sent to any of the Willow Run plant's local sound zones.

With an RCA Sound System emergency messages reach any or all parts of the plant or grounds—at the same moment. RCA Sound Systems are "Unit-built" to meet the type and size of individual plant requirements. For complete information see your nearest RCA Sound Products distributor, or write: Sound Products, Department N117, RCA, Camden, New Jersey.

RCA

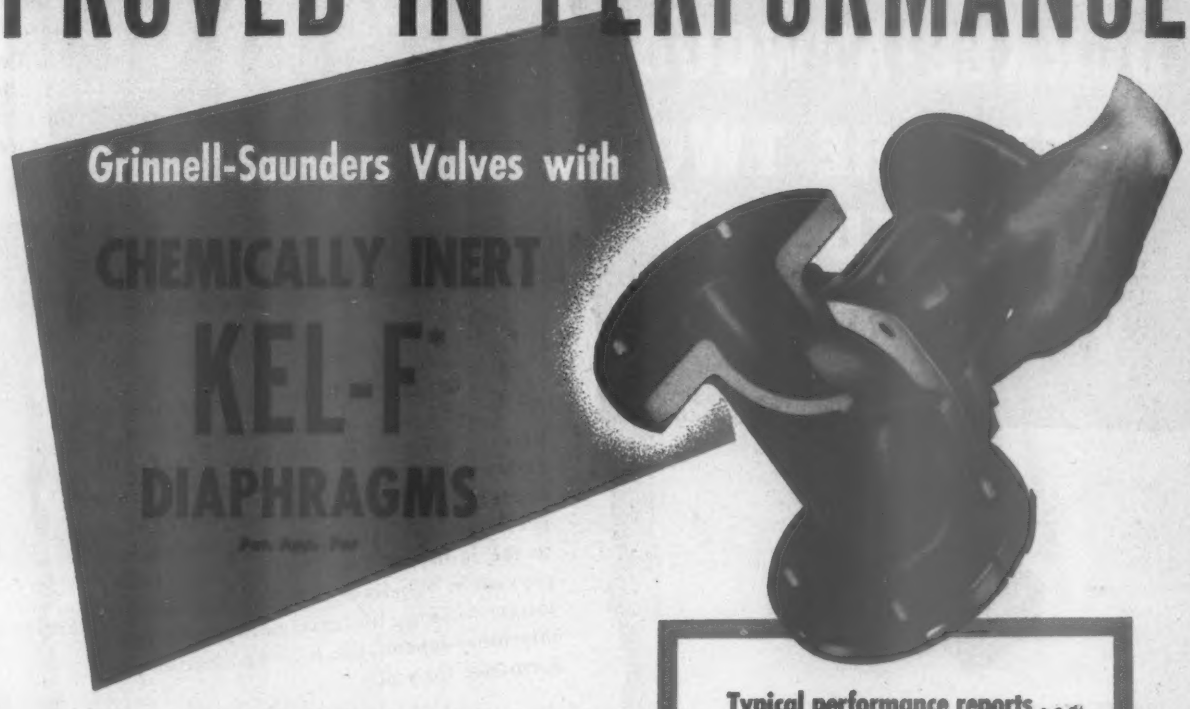
SOUND PRODUCTS

RADIO CORPORATION of AMERICA

ENGINEERING PRODUCTS DEPARTMENT, CAMDEN, N.J.

In Canada: RCA VICTOR Company Limited, Montreal

PROVED IN PERFORMANCE



Grinnell-Saunders Diaphragm Valves with KEL-F Diaphragms are living up to every promise made for them! At the right are reports from typical users.

KEL-F's resistance to chemical action, low cold flow, wide range of temperature application and exceptional flex life combine to make it the most important diaphragm development in years. KEL-F is chemically inert to all organic acids and alkalies in all concentrations. It withstands chlorinated aliphatic and aromatic compounds, concentrated nitric, chromic, hydrofluoric and sulphuric acids and most solvents which readily attack rubber and previous synthetic diaphragm materials.

While KEL-F is tough and flexible, it is not resilient. To provide resiliency for proper closure of the valve and to provide added support for the KEL-F diaphragm, it is backed with a rubber cushion. A free-floating method of attachment to the compressor assures an even closing pressure on the entire surface of the weir. A tube nut which floats as the rubber cushion presses down in closing the valve, eliminates excessive pressure on the diaphragm stud. The rubber cushions the closing force, thereby reducing wear and cutting action on the diaphragm. In accelerated tests, a 2-inch valve with a KEL-F diaphragm withstood over 80,000 closures, drop tight, against 80 pounds of air under water with no leakage and no visible signs of wear. Write for complete information.

Typical performance reports . . .

1. Chlorine and HCl gas with small amounts of acetic acid and acetyl chloride at 302° F. for 900 hours. Very much superior to material it replaced.
2. Mixed aromatic and ketone solvents at 230° F. and 10 psi for three months. No sign of deterioration.
3. Chlorinated organic chemical at 158 to 194° F. and 30 to 40 psi for nine months. No failure, no shutdown, no replacement.
4. Chromyl chloride at ambient temperature and 15 psi. Diaphragm condition good at end of thirty days' test.
5. Liquid chloral saturated with HCl at 158° F. for 408 hours. Well satisfied — have placed orders for additional diaphragms.

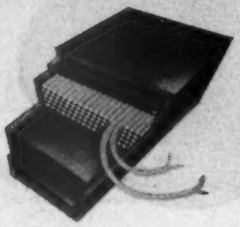
*"KEL-F" is the registered trade name for polytrifluorochlorethylene, an exceptionally stable thermoplastic. It is produced by the M. W. Kellogg Co.

GRINNELL

WHENEVER PIPING IS INVOLVED

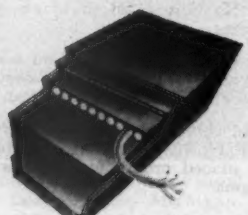
GRINNELL COMPANY, INC., Providence, R. I. Warehouses: Atlanta • Billings • Buffalo • Charlotte • Chicago
Cleveland • Cranston • Fresno • Kansas City • Houston • Long Beach • Los Angeles • Milwaukee • Minneapolis • New York
Oakland • Philadelphia • Pocatello • Sacramento • St. Louis • St. Paul • San Francisco • Seattle • Spokane

DURKEE-ATWOOD MEETS THE TWO BIG NEEDS OF V-BELT USERS



DURKEE-ATWOOD MULTIPLE V-BELTS

Iso-Dynamic Matching guarantees the absolute uniformity of each set of D-A Multiple V-Belts. Not only are they manufactured under strict controls but every set must also pass the rigid Iso-Dynamic Matching Test devised by D-A engineers. Using special testing equipment, inspectors run matched belts under full load to assure exact equality of load distribution and tension. As a result, D-A Multiple V-Belts deliver more efficient power transmission



DURKEE-ATWOOD GENERAL DUTY V-BELTS

Durkee-Atwood's special "high cord line" construction keeps the belt under full compression at all times. This advantage reduces slippage and provides smooth, uniform power transmission. And because all surfaces which contact the sheave are under equal compression, the load is distributed evenly and the belt has a longer working life. D-A General Duty V-Belts are designed specifically for light machinery and small diameter sheaves.

1. QUALITY—Behind Durkee-Atwood is a 40-year record of quality products . . . strict attention to detail. Every D-A Industrial V-Belt is manufactured from the finest raw materials available, built to exact specifications on the most modern machinery in the industry. This "quality first" policy pays off in V-belts with strength, flexibility, longer working life, maximum power transmission—dependable, high-production performance for you.

2. SERVICE—A simple belt replacement . . . or help in designing a new transmission set-up—they're both important parts of the D-A service organization. Every D-A Distributor is hand-picked to deliver the prompt, dependable service that every V-belt user deserves. That means the right-sized belt—*delivered when you want it*—from the complete stocks of a full line. Or if you have a special design or production problem, D-A transmission engineers will work with you . . . give you the benefit of their experience on any V-belt application.

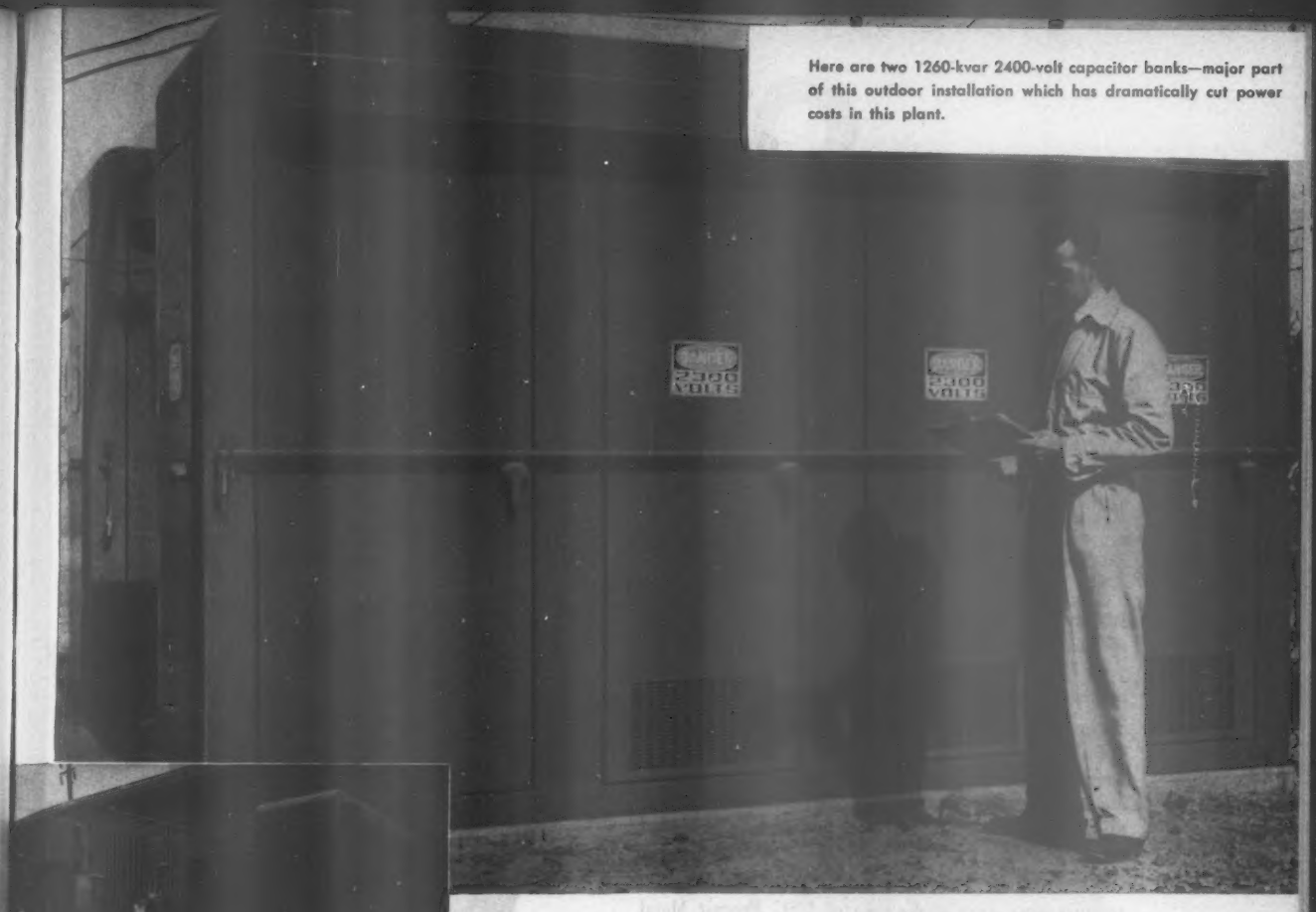
NEW! Durkee-Atwood Industrial V-Belt Catalog —write for your free copy today.

DURKEE ATWOOD V-BELTS

DA PRODUCTS SINCE 1910

DURKEE-ATWOOD COMPANY, MINNEAPOLIS 13, MINN.
DEPARTMENT F2

FORM NO. 511



Here are two 1260-kvar 2400-volt capacitor banks—major part of this outdoor installation which has dramatically cut power costs in this plant.

Saves $40,000 a year

West Coast chemical plant gets 50% annual return on 3840 kvar of General Electric outdoor capacitors

A $40,000 annual saving on power costs sounds almost too good to be true—yet that's what a West Coast chemical plant gets. A total of 3840 kvar of G-E capacitors, engineered into the plant's power distribution system, are doing the trick. After taking the installed cost of the capacitors, adding a 15 per cent annual charge for depreciation and maintenance—the return is still about 50 per cent a year on the investment.

MATCHED TO THE SYSTEM. Two 1260-kvar banks of Type HLO outdoor capacitors are installed in the high-voltage switchyard through a 3000-kva, 22000/2400-volt step-down transformer bank. Two smaller banks, of 330 and 990 kvar, are part of a 7500-kva double-ended load-center.

HELPS IN POWER SHORTAGE. During the recent water shortage in the west, the power company had to limit the kva delivered to industrial users. This chemical plant's capacitors, keeping the power factor at close to unity, enabled them to squeeze every last available kilowatt out of their kva allotment.

KEY TO LOWER POWER COSTS. If you haven't considered capacitors within the last two years, it will pay you to check. The present-day price of capacitors in relation to other equipment has changed the picture of capacitor economics. This West Coast plant is just one of many that are cutting power costs —or relieving overloads—with capacitors. Your local G-E sales office or authorized G-E agent or distributor can help you —or write to Section 407-199 for booklet GEA-5167—"A Way to Cut Power Cost." *Apparatus Department, General Electric Company, Schenectady 5, New York.*

GENERAL ELECTRIC

407-199

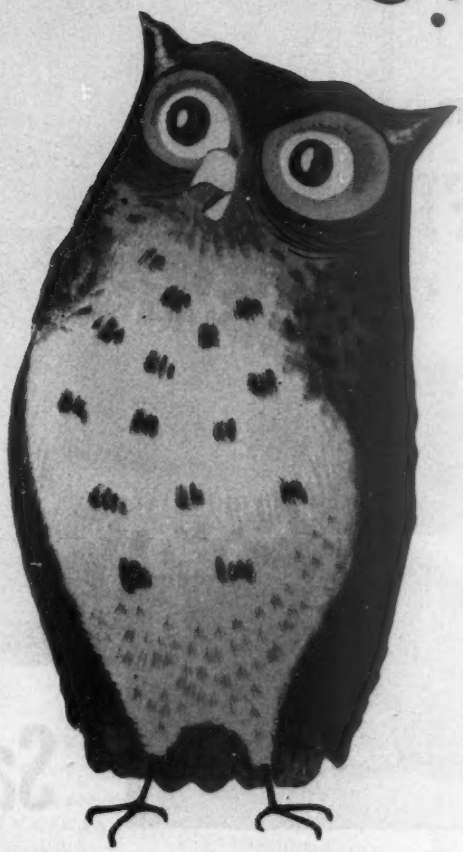
DID YOU SAY "WHO-O-O?"

It's U.S.G. roof deck contractors, of course...who build

SHEETROCK-PYROFILL

T. M. Reg. U. S. Pat. Off.

poured-in-place gypsum roof decks



It's always wise to stick to the specifications . . . and specifications that call for SHEETROCK-PYROFILL call for your U.S.G. roof deck contractor. *For only U.S.G. roof deck contractors can install* SHEETROCK-PYROFILL *roof decks.*

Not only does the roof deck they build meet the most exacting requirements because it's incombustible, lightweight, strong, and easy to maintain . . . it meets your construction schedule because SHEETROCK-PYROFILL is quickly installed—up to 20,000 feet poured a day—and sets in less than 30 minutes.

Besides SHEETROCK-PYROFILL, U.S.G. roof deck contractors also erect roof decks of USG Precast Metal Edge Gypsum Plank and Short Span Tile.

For the name of your U.S.G. roof deck contractor, write Industrial Sales Division, United States Gypsum Company, Chicago 6, Illinois.

Plant of Westinghouse Electric & Manufacturing Co., Chicago. Bruce A. Gordon Co., Chicago, engineers. Sheetrock-Pyrofill Roof Deck (203,000 sq. ft.) installed by Anning-Johnson Co., Chicago

Note how SHEETROCK-PYROFILL anchors itself to the steel purlins

United States Gypsum

For Building • For Industry

Gypsum • Lime • Steel • Insulation • Roofing • Paint

WRIGHT Again!

now...new FRAME "B" Speedway

ELECTRIC HOISTS

● Safety, efficiency, adaptability, and rugged construction are the main qualities of these modern hoists, ideally balanced for hook suspension.

Alloy steel gears, self-lubricating ball and roller bearings, preformed improved plow steel cable, grooved drum, rigid metal weatherproof wire conduits, silver contact controls . . . these are but a few of the features that mean long life and low maintenance of the finely balanced **Wright Frame "B" Speedway Hoists.**

Hook, lug, or trolley mountings permit use of the Frame "B" Speedway in formerly unusable locations. Capacities from 250 lbs. to 1000 lbs.

Call your distributor today for full information on the Wright Frame "B" Speedway . . . or write to us direct.

ACCO

York, Pa., Chicago, Denver, Detroit, Los Angeles, New York, Philadelphia, Pittsburgh, Portland, San Francisco, Bridgeport, Conn.

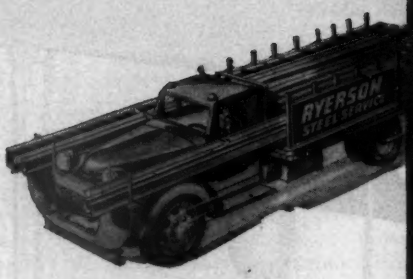
TRADE MARK

WRIGHT HOIST DIVISION
AMERICAN CHAIN & CABLE

"Intentionally Better"
HOISTS
TROLLEYS
CRANES

In Canada: UPTON, BRADEEN & JAMES LTD., Montreal, Toronto, Vancouver, Windsor, Winnipeg

At right, one of the many building projects in the current Ryerson expansion program.



Procurement problems today but . . .

We're Building for the Future

Faster and better steel service is in the making at Ryerson. This big new addition to one of the thirteen Ryerson plants is part of an extensive program of expansion and modernization that's under way in Ryerson plants from coast to coast.

As you know, the requirements of national defense, plus peak civilian demand now make it impossible for us to take care of many requirements—much as we would like to. And there's little that we can do to change this situation at the moment.

But we are spending millions of dollars on new plants and equipment in order to be better prepared for the day when we'll again be able to furnish all the steel you need, when you need it. Meanwhile, call us—we'll help you to the limit of our ability.

PRINCIPAL PRODUCTS

CARBON STEEL BARS—Hot rolled and cold finished
STRUCTURALS—Channels, angles, beams, etc.
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SHEETS—Hot and cold rolled, many types and coatings
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ALLOYS—Hot rolled, cold finished, heat treated
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THE "MASTER PLAN"

FOR DEFENSE MOBILIZATION IS NOW SET

- **Indecision in Washington is nearing an end. Requirements are set, will be known in detail soon.**

- **For you, as a manufacturing executive, this means:**

1. **You will have practically no copper for civilian production after mid-1951.**
2. **You probably won't be allowed to increase plant capacity until 1953, unless you're producing basic metals.**
3. **You will get some military contracts, but will not be asked to convert completely to defense work.**
4. **You won't get any machine tools except on priority.**
5. **You will have to scramble for maintenance, repair, and operating supplies.**
6. **You won't get any direct help with materials for civilian production under the coming Controlled Materials Plan.**
7. **You can count on almost 100% draft protection for veterans, married men, and those over 25 years old.**

● UP TO MID-JANUARY, the National Production Authority was "flying by the seat of its pants" on its control orders.

NPA's explanation: We had no clear idea of exactly what military requirements would be.

NPA was waiting for the Munitions Board to come up with figures for so many tanks, so many planes, etc., translated into so many pounds of steel, aluminum, copper, and so on.

The Munitions Board, in turn, was waiting for the top-level National Security Council to approve the so-called "master plan."

The master plan is now set.

Already, the Munitions Board has worked up preliminary figures on military requirements to put this plan into operation. It hopes to have all the details by March 1.

Munitions Board Chairman Small says the preliminary figures won't change by more than plus or minus 5% when the details are in.

That means NPA now has relatively firm figures on which to base its future control actions. We can't give you exact figures because of military security. But enough information can be made available to give

you some good guideposts to action for your own plans and operations.

To interpret these guideposts, you have to understand the basic policy of military procurement. Here are the key points in that policy:

1. We are not starting an all-out drive for military production at this time.

2. The Armed Forces have determined the probable rate of use per month for each item of materiel in the event of all-out war.

3. The Armed Forces have determined the length of time it will take—starting from scratch—to get production of each item up to the rate at which it would be used in all-out war.

4. Starting now, we will produce as fast as we can until military inventories are big enough to support an all-out war from the start of the war until production can be raised from zero to the level of military usage. (The time needed to do this, and therefore the military inventory to be built up starting now, will be different for each item.)

5. As soon as military inventories are at a "satisfactory" level, production will be cut back to a point where it just equals "current usage." ("Current usage," defined by the Armed Forces is "police actions," plus training, plus replacement of items which deteriorate or become obsolete.)

Unless we have all-out war, the picture will be this: A build-up of military production during 1951 and 1952. It will reach 20%, perhaps 25%, of our total national production. During 1953 and 1954, military production will ease off, probably to about 10% of total production.

Sounds easy. But don't forget this: During 1951 and 1952, when the military "take" will be at its peak, there will be a big diversion of both manpower and materials for expansion of basic metals production and for "essential supporting activities," like freight cars and ore boats.

It adds up to a rough time in 1951-52. Nonessential civilian items will be cut back sharply by end-product limitation orders. NPA has a whole raft of them in the works. One bright spot: There's more steel for civilian use than previously expected. The dark spot: Copper will be tighter than anyone imagined possible. For all practical purposes, copper will disappear from civilian markets by the end of 1951.

The pay-off will come in 1953. At the same time that military procurement drops off, expanded capacity for basic metals will begin producing in significant quantities. The hoped-for result: By late 1953 or 1954, we'll be able to meet military requirements in full and still have more materials for civilian production than we had in the record peacetime year of 1950.

The price will be a planned economy for at least the next two years. Maybe longer. Washington knows "planned economy" is a hateful term to most Americans, and particularly to industry. So it isn't being used much except behind closed doors. But taxes, lending, credit controls, military manpower, materials allocations, expansion authorizations, price and wage stabilization, and consumer rationing are all being coordinated in a single overall economic plan to accomplish a firm military objective.

More Restrictions On Copper

NPA's first end-product limitation order (M-12) bans the use of copper after March 1 in some 300 items. It is a mild foretaste of what's coming.

Direct military requirements for copper are now known through the final quarter of calendar 1951. Military security prevents release of the exact figures. But it is understatement to say the requirements are tremendous.

Remember the time in World War II when we had to withdraw monetary silver from the government vaults at West Point to use as bus bars because of the copper shortage? Government officials told FACTORY that the copper situation could easily become that serious again during 1951.

We were even told it is "possible" that direct military requirements plus "essential supporting activities" with military priorities will take so much copper that the Munitions Board will have to stop buying copper for the national stockpile.

Every sign points to the fact that any production you want to continue without military priority after Jan. 1, 1952, will have to be without so much as a single pound of copper. (The limited amount of copper available for production of maintenance, repair, and operating supplies will be an exception.)

Faced with this fact, you should:

1. Start conserving copper by every conceivable means, including methods of salvage you would not ordinarily use because they are "uneconomic." (Especially when copper goes under price control, there will be a temptation not to salvage if the cost per pound to salvage copper is greater than the "ceiling" per pound.)

2. Start planning for use of substitutes for copper. If you can't find a substitute to use in a particular product, start looking for another product to make that won't use copper.

The Plant Expansion Outlook

The Defense Production Administration—acting through NPA—is going to put a virtual stop to expansion of metal fabricating facilities. Fabricators of nonmetal products will be sharply limited in any plans they may have to expand.

FACTORY's source explains the still-unannounced policy this way:

"We already have too much capacity for 'chewing up' the limited amount of copper, steel, and aluminum we can produce.

"Until we can increase our basic production of those metals, we would simply be throwing our whole in-

dustrial machine further out of balance by expanding our fabricating facilities.

"In a field like electronics, where military requirements may outstrip our total present facilities, some expansion may be needed.

"But with such limited exceptions, we see no justification for using up scarce materials in construction of a further surplus of facilities for fabricating those same scarce materials. This would make the situation worse than it now is from both ends at once: It would increase demand for materials by bringing new facilities into being, and would decrease the supply available for fabricating by using up what little we have in the construction of the new facilities.

"The situation is not so extreme in the nonmetal-working field, but the same argument applies.

"We are in for a long pull. So I think it follows that the first thing we must do is expand production of basic metals and minerals—plus, naturally, supply military requirements. Any diversion from those purposes will make the long-run civilian production situation just that much worse.

"Unless we have all-out war, military procurement will probably reach a peak in late 1952 or early 1953, then drop off. And by that time, new capacity in basic metals should be coming in.

"That is when we can start expanding our fabricating facilities—to the great advantage of our civilian supply. But the time we arrive at this situation may be indefinitely delayed if we try to do everything at once and begin expansion before we have the metals to use the new facilities at their economic capacity."

The mobilizers have plenty of authority to clamp the lid on expansion of fabricating plants. The first evidence of this new policy will be greater difficulty in getting "certificates of necessity" that will permit you to get a tax saving through fast write-off on your new plant. The actual curb on new industrial construction will come later.

Spreading Defense Contracts

"Broaden the base for military procurement." This is a popular expression in Washington these days.

Here's what it means:

Give as many manufacturers as possible some defense work. Convert few, if any, manufacturers to 100% defense work.

The theory is to give a lot of people some experience with the work they would do in all-out war. If a man has produced even a handful of bazookas, he will be able to get into mass production far faster than as though he had produced none. All the basic engineering work will have been done; he will know what tooling is needed; and most of the "bugs" will have been ironed out of the production process.

On the other hand, if a manufacturer converts 100% to defense work now, he will be faced with the problem of reconversion if the expected cutbacks in military production come along in 1953 and 1954.

All Machine Tools to Go On Priority

Instructions have been sent to machine tool builders to get to work on "phantom orders" just as soon as they complete any nonpriority jobs now in process.

It means this: Any capacity not used for priority work will be used for building tools covered by the no-longer-phantom orders. Unless they're for defense work, you won't get any new machine tools.

The tools built on phantom orders will be of the general purpose type and when completed will be available only where needed for processing military orders.

Limiting new machine tools to essential producers only ties right in with plans to halt expansion of metalworking facilities. There is a strong feeling that new tools needed for "partial" conversions and the few essential new plants will take up the entire tool output for 1951 and 1952.

MRO to Get "Some" Priority Help

Getting maintenance, repair, and operating supplies (MRO) was a big headache for industry in World War II. We seem to be headed right back into the same old mess.

There are two obstacles to any clean-cut program of priority assistance for MRO:

1. Priorities of any kind involve a lot of paperwork. So many different types of items comprise the MRO classification (and so many of them are one-of-a-kind for special applications) that the paperwork involved in individual priorities would be completely impossible to administer.

2. Processing priorities takes time, especially if a lot of paperwork is involved. Many MRO items are needed on an emergency basis. For want of a single elbow joint in a lubricating system a whole production line may shut down.

Officially, development of a "long-term" MRO program is "pending" at NPA. Actually, the matter is still in the hands of NPA's Program Bureau. That means it has not yet reached the operating level. Some "discussions" have taken place with operating people, but the program is still weeks and maybe months away from activation.

Meantime, NPA has amended its priority regulation to provide some "temporary" assistance in one particular area of MRO: jigs, dies, tools, and fixtures.

You can obtain such accessories by "extending" the DO-rating on the contract for which you need them. You can use this procedure only "if the inability to procure such accessories would result in a failure to meet delivery dates established in such rated order."

Materials to Go Under "Half" a CMP

You had better start hiring and training expediters if you want to get tight materials for civilian production. Here's why: The Controlled Materials Plan that will start at mid-year will be only half a CMP by World War II standards.

Mechanics of the plan will be the same. It will control the same materials as last time—carbon and alloy steel, copper and brass, and aluminum. But CMP-1951 will be an "open-end" plan. That is, CMP-1951 will issue authorizations for materials only for military requirements and "essential supporting activities," such as freight cars, new steel and power plants, etc. Whatever is left over will be a "free pool" for civilian production.

Here's how the "open-end" plan will work: As soon as Bills of Materials are available for military production and supporting activities, NPA will subtract these requirements from total supply available. This will tell how much there is for civilian production. NPA will then gear its limitation orders to the supply. By banning certain products and limiting production of others, it will be possible to achieve "something close to a balance" of civilian demand and "free pool" supply of controlled materials.

Take an oversimplified example. Say third-quarter production of steel will be 25-million tons, and that military and supporting activities require 10-million tons. That would leave 15-million tons for civilian production. On the basis of "relative essentiality" of civilian items, NPA might then order manufacturers to make no ashtrays of steel, 50% as many flatirons as last year, 75% as many autos, etc. The theory is that steel requirements for production thus "authorized" would add up to just 15-million tons.

However—and this is the important point—this type of authorization would in no way guarantee supply of the materials. You would still have to hunt for them, get deliveries the best way you can.

And we think you can bet your bottom dollar that industry and consumer pressure will result in "authorizations" in excess of available supply. It will mean a tough, competitive fight.

The old CMP went considerably beyond this. The Office of Civilian Supply "programmed" civilian requirements. These programs were sometimes determined by available supply, more often on the basis of what OCS considered absolutely essential for civilian markets. Then the manufacturers affected by the programs would submit Bills of Materials. When these were totaled, the WPB Requirements Committee would cut back civilian or military programs or both to bring the total requirements of authorized production into balance with supply.

When an authorization for controlled materials was issued to a manufacturer—whether for military or civilian production—he was assured of delivery in full.

In view of the very tight copper situation, CMP-1951 will probably program all production involving copper by the start of 1952. Unless there is a marked change in NPA plans, steel and aluminum will probably be carried on the "free pool" basis through the foreseeable future.

We asked Walter Skuce, head of NPA's Controlled Materials Plans Division why the "open-end" plan. Perhaps the most important reason is the reduction in paperwork: There are a lot of forms and paper for every product made under CMP.

Another reason is that manufacturers will have more flexibility in production. Under CMP, you must know exactly what you are going to produce as much as six months ahead. Then if deliveries are help up—as happens even under CMP—you lose production because you are not free to make fast changes.

Skuce also points out that the "free pool" for civilian production was used successfully in the final months of World War II, when military production was dropping off rapidly.

However, that was a period of transition from war to peace, with reconversion shutdowns damping demand for materials. A lot of people we talked to question whether the same plan will work in a period of semi-mobilization, with civilian production facilities still operating at a high rate.

How the Draft Will Hit You

You can now see pretty clearly how Selective Service will affect your present personnel. The only question mark remaining is members of the reserves.

With the Armed Forces' target set at 3.5-million men, here's how the situation lines up:

If the draft age is lowered to 18—and that seems quite likely—we can get the 3.5-million without drafting veterans, without drafting married men, and without drafting those over 25.

You can count heavily on not losing veterans or men over 25 to the draft. There's an outside possibility the law might be changed to permit drafting men under 26 who have married since last June 25. You can be pretty sure that the draft won't take men married before that time.

It also follows that you can be fairly sure that you will lose any physically fit, unmarried, nonveteran under 26.

There is less certainty about members of the reserves. The Department of Labor's lists of "critical occupations" (now 83) and "essential activities" (about 900) are being revised. The Armed Forces have "agreed in principle" to deferment of reserves on the basis of these lists.

The exact extent to which reserves covered by these lists will be deferred is not certain. But you can take some comfort in the fact that there is a growing realization that stripping industry of its skilled workers, engineers, and research personnel is a short-sighted policy in a long-term mobilization.

And the military policy is now fixed: A rapid build-up to a force that can be maintained for a long mobilization period.

LOOKING AHEAD IN LABOR

Last-minute round-up as we go to press

Control of wages; no control of strikes or manpower. That's what Washington plans for you.

Under the law, price ceilings force wage "stabilization." So you will have to limit your wage adjustment to what the wage stabilization board will allow.

Wages won't be "frozen" by any means. Some limits will be set, but there will be plenty of room for bargaining within and around them.

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It looks as if the Wage Stabilization Board will let wages rise about 10% above May-June levels. Roughly, that's the pattern set in steel and coal mining. This means higher wages next month for most auto workers and others under cost-of-living escalator clauses.

Fringe wage issues will be allowed, too—better vacations, pensions, health insurance, merit increases, incentives.

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What to do with the 4-cent "annual improvement" increase in the General Motors-type contract raises a special problem. G-M's boost is due in June. We expect it, too, will be allowed.

What you can expect, really, is a controlled rise in wages and other costs. It won't be stopped.

•

A no-strike pledge is not in sight. Truman isn't asking for it. Industry doesn't want one if it means compromising Taft-Hartley. That's what labor will want: a "deal" cutting the heart out of the labor law.

Actually, a no-strike pledge is not needed—yet. Strikes are not hampering defense production. Auto labor contracts run until 1955, steel until next January, coal until April 1952. Strikes will not be a big problem this year.

•

Real manpower controls are a year off, at least. We mean such measures as a mandatory 48-hour week, job freezes, manpower ceilings. Meanwhile, 13 regional labor-management committees will suggest ways to alleviate shortages in particular areas.

Sign of the times: General Electric has abandoned appeal of a court order denying its right, under contract, to retire women at 60, men at 65.

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Don't figure on any labor legislation from this Congress. Here's a rundown of major issues:

Taft-Hartley: Truman isn't asking repeal this time. Only "improvement." If any changes come, Taft will pick them. He won't get into a fight with unions over amendments. Unless labor leaders go along with some improvements, Taft will leave the law unchanged. Repeal is out.

FEPC: Liberal Democrats and Republicans are asking for a fair employment practices law. That's for the record. They know there's no chance of putting one through. Truman won't push it. Prospect: An FEPC set up by executive order.

Social Security: Truman wants more liberal Social Security and unemployment compensation and a start on compulsory health insurance. He won't get them.

•

Organized labor doesn't look for any rough treatment from state legislatures. In fact, leaders point hopefully to requests for more labor benefits asked by governors in Michigan, Missouri, Massachusetts, Vermont, North Carolina, Minnesota, and Rhode Island. Nevada is different, may adopt a "right to work" law outlawing the closed shop.

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Some guides to wage deductions under Taft-Hartley from the Supreme Court and NLRB:

Unemployment compensation: The Supreme Court backs up NLRB policy on back pay to workers unlawfully discharged. In paying worker wages lost, you can't deduct what he collected from the state in jobless pay. (*Gullett Gin*)

Union fine: A fine is not considered "periodic dues." Therefore, NLRB says, you may not dismiss a worker under a union security contract for failing to pay a union fine. (*Parker Pen Co.*)

Assessment: A union assessment is considered the same as dues and is deductible from wages in a checkoff. However, when dues are raised and the increase collected only from members who do not attend meetings, that amounts to a "fine." (*Electric Auto-Lite*)

LOOKING AHEAD IN BUSINESS

Last-minute round-up as we go to press

Taxes are going to put a heavy bite on business. Corporation taxes in this fiscal year will total about $13.6-billion. The increase already passed by Congress—plus increasing business activity—will raise that to $20-billion in the fiscal year ended June 30, 1952.

New taxes, which will probably come in two installments this year—may well raise the levy on corporations another $5-billion.

Personal income taxes will have to be geared higher than in World War II to meet the President's goal of raising at least another $15-billion of revenues. Rates will go up to World War II peaks—and exemptions will have to come down to bring in new millions of small taxpayers.

New kinds of taxes—perhaps a federal retail sales tax—will be needed to avoid a deficit in 1952. Under today's schedules, federal, state, and local taxes will take about 29% of the national income. Raising them as the President recommends means the tax collector will get one dollar in three of the national income.

Even with this kind of a tax boost, the government will run a heavy deficit when defense production gets into full swing. Two years from now total federal spending may be running at the $80-billion-plus level—as the mobilization effort reaches its peak. Taxes—even with the increases the President wants—will fall short of closing that gap by $10-billion or more.

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All this will put terrific pressure under prices. And it shows why the U.S. is forced to use economic controls to meet mobilization strains.

Prices can only go up—in the months ahead. They'll go up in spite of controls.

Since Korea, prices of industrial raw materials have jumped 42%. Wholesale prices—and prices of manufactured goods generally—are up 13%. But the cost of living has climbed only about 5%. Living costs lag behind because it takes time to translate industry's higher costs into retail prices. But the sharp surge in food in the last two months means living costs will jump this spring.

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The federal defense budget shapes the outlook for business for the next year—and more.

The President's budget sets the minimum of military planning.

As the budget shows it, spending for the military will jump from $21-billion in fiscal 1951 (which ends this June 30) to almost $42-billion in fiscal '52. To the '52 figure, you can add more than $10-billion for foreign military and economic aid, atomic energy, and other programs geared closely to defense.

This is an "open end" budget. There are few details on just what the military will be buying. There is a lot of room for expanding the mobilization program fast if that becomes necessary. And there's no indication in the budget of when the program will hit a peak—or what the rate of spending may be at that peak.

Of the military funds, about 60% will go for equipment and military construction. That high percentage reflects the stress on getting equipment rather than getting men into uniform.

In addition, the military will set up reserve production capacity—for 50,000 planes a year, for example. That's close to the equivalent of the aircraft industry's wartime peak.

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This concentration on "hardware" will absorb all the capacity of U.S. metalworking industries beyond essential civilian production—when the program gets rolling.

From the budget's general picture, it is possible to say this much about its impact on industry:

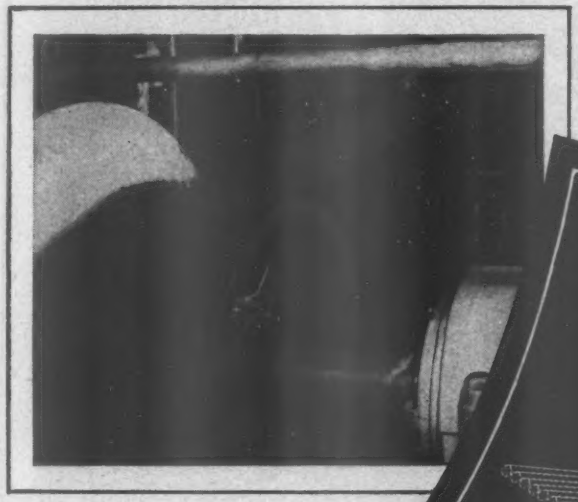
Nonferrous metalworking and electronics will be converted practically entirely—almost as they were in World War II.

What happens to chemicals will depend on their final use—much benzene and alcohol will be diverted to synthetic rubber, for example. Heavy chemicals in general promise to stay tight.

Military demands for food and textiles will be about two-thirds of World War II requirements—because these generally are geared to troop strength. We'll build some reserves and also supply our allies. But plans call for our mobilizing only perhaps 3.5-million men now—compared to the 12-million of 1945.

Army needs of paper and lumber will be much lower than in World War II.

How to trim the "fat" from a V-Belt drive



STANDARD belts—required 12 belts on 25" diameter pulleys.
GOODYEAR Steel Cable Belts recommended by the G. T. M.—Goodyear Technical Man—8 belts on 27" pulleys carry the load because they're "muscled" with steel.

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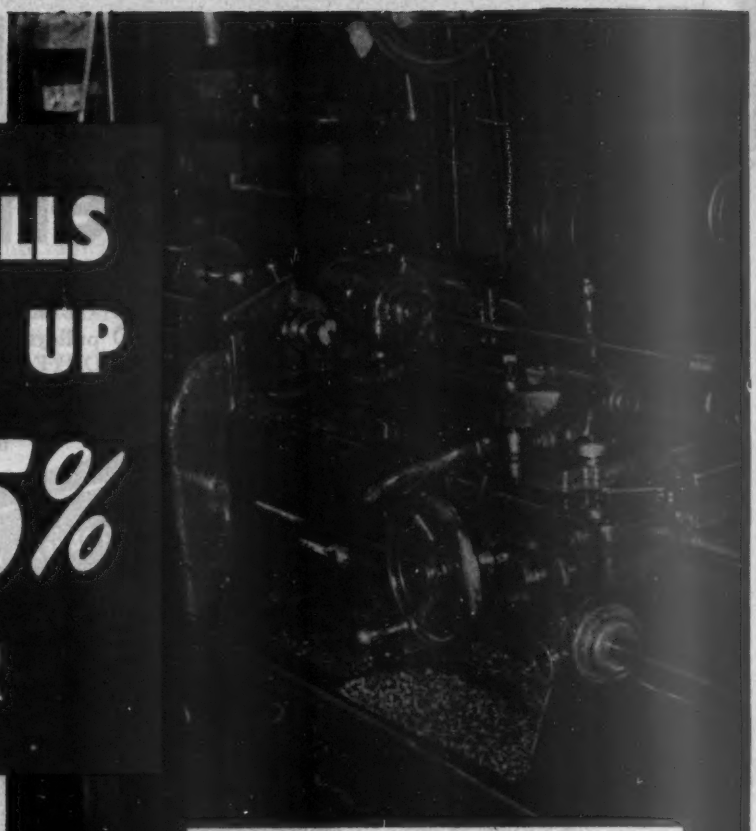


The job:	Drilling shotgun barrels
Stock:	Blank bar 1117 steel, 25" long
Feed:	6" per minute
Dia. of holes:	0.395" and 0.595"
Speed:	5000 rpm and 3600 rpm or 509 sfpm and 509 sfpm

Texaco Sultex Cutting Oil speeds the work, cuts the cost

On this job* Texaco was called in to see what could be done to overcome short tool life. With a competitive cutting fluid in the machine, drills were wearing badly and rounding over quickly. The Texaco Lubrication Engineer spotted the need for a totally different type of coolant and recommended *Texaco Sultex Cutting Oil* as best suited to the requirements of the metal being worked and the machining set-up.

As soon as *Texaco Sultex Cutting Oil* went into use, production between tool grinds increased 21 pieces for the smaller drill, 24 pieces for the larger —a 60% to 75% increase in tool life, with a corresponding reduction in down time for tool changes.

This is an excellent illustration of how the high quality of Texaco cutting fluids, combined with the practical know-how of Texaco Lubrication Engineers, assures better, faster, lower-cost machining—whatever the metal or the method of cutting it.

There is a complete line of Texaco Cutting, Grinding and Soluble Oils. A Texaco Lubrication Engineer specializing in machining operations will gladly help you select the right ones for best results in your plant. Just call the nearest of the more than 2,000 Texaco Distributing Plants in the 48 States, or write The Texas Company, 135 East 42nd Street, New York 17, N. Y.

*Name of this Texaco user on request.

TEXACO

TEXACO Lubricants, Fuels and Lubrication Engineering Service

FACTORY MANAGEMENT AND MAINTENANCE

HARRY LEE WADDELL, EDITOR

PRODUCE MORE – WASTE LESS

MOST PLANTS WON'T HAVE direct military orders for a long, long time—if ever. Yet their managers and employees are production soldiers just the same.

It's popular to say that we'll win or lose the struggle with Russia in our war plants. That is only part of the story. Our way of life is almost equally at stake in the thousands of plants turning out goods that civilians want and need.

A sure way to lose a long-drawn-out arms race with Russia is to shrink our civilian output so low that there can be only two results: (1) a runaway inflation, or (2) complete and rigid controls that wipe out the incentives of our capitalist system.

It's popular to say, too, that the fate of our civilian output is up to the government. That is only part of the story. For our level of output depends also on whether every manager and every employee—in any kind of plant—does his part to waste less manpower and less material.

WILSON'S OBJECTIVES

Charles E. Wilson has made clear the first goal of his Office of Defense Mobilization: **100%-on-schedule delivery of the vast requirements of the armed forces.**

But Wilson will not be content if, to reach his No. 1 goal, we have to go on a skin-and-bones diet of civilian goods. Wilson adds—almost in the same breath—that ODM has another aim: **to promote the greatest possible volume of civilian goods and keep our living standard the highest in the world.**

How do we reach these twin goals? Part of the answer is to expand our production facilities. ODM intends to promote expansion with all its might—first, of course, in the basic raw material industries. But that is not all of the answer. Expansion of plant won't overcome these two immediate facts:

1. The need for more men in the armed forces and in defense production will mean less manpower to provide goods for civilian markets.

2. Military needs will mean less of many raw materials for civilian products.

Temporarily, at least, these two facts will bring a sharp cut in the amount of goods for civilian use. Will the supply get better or worse? A lot will depend on the size of the military program that the world situation demands. And a lot depends on whether *you*—in industry—meet the challenge to produce more, waste less.

HOW TO MEET THE CHALLENGE

You can meet the challenge if you will keep two more facts firmly in mind at all times—whether you are producing civilian or military goods:

1. We can make more goods with fewer man-hours of labor. This has been a firm trend in America's past. We must speed up that trend. This means we stop any present waste of manpower, make better use of the man-hours that are available. We must—and we can—produce more goods with less manpower per unit of production.

2. We can make more goods with less scarce materials. To do this we must not speed up a trend, but reverse it. We must clamp down hard on our waste of all materials. We must use substitutes for scarce materials where possible—and develop new substitutes. We must put into each product the least amount of material that will permit the product to do its intended job. We must—and we can—produce more goods with less material per unit of production.

OUR REWARD

If we meet the challenge to produce more, waste less, we shall have more goods for our civilian markets—at any given level of military demand—than we could otherwise expect. There will be another important result of greater and more efficient production: By helping to hold inflation in check, we can supply our armed forces at less cost.

To produce more, waste less in ordinary times is plain good business. In the national emergency it is a matter of necessity, perhaps of survival.

The Facts about

HOURS OF

One way to stretch the manpower supply in industrial mobilization is to go to the longer work week. This raises tough questions. Exhaustive studies made by Dr. Max D. Kossoris take a lot of the guesswork out of the problem.

Kossoris concludes

DR. MAX D. KOSSORIS

. . . Regional Director, San Francisco office of the U. S. Department of Labor's Bureau of Labor Statistics.

. . . head of a BLS task force that made a comprehensive study of the effect of working time on productive efficiency of workers during World War II.

. . . regarded as one of the country's leading authorities on hours of work and output as the result of his own research and his detailed knowledge of other research done in this country and abroad.

- **There is no "ideal" work week** that would fit every plant. It depends on degree of mechanization, physical effort needed, and worker control over speed of operations.
- **You don't lose much efficiency** when you go from 40 hours a week to 48. With a 20% increase in the work week, you will raise output 18% to 19% on the average.
- **After 48 hours, look out.** True, you may get more production. But at what cost? You may get as little as one hour's output for 3½ hours' pay (at time and a half).
- **Beyond 58 hours, efficiency slumps** sharply. Over the long pull, you'll get as much total production in 48 hours as in 66.
- **If you're thinking about a 7-day work week,** forget it. Even supermen go stale without some time off. Upshot: You'll pay double time for the seventh day, and workers will be out on straight-time days. In one plant, a cutback to 6 days actually increased total production 12%.
- **As the manpower bottleneck closes in,** absenteeism will jump, especially on the sixth day of the work week—and especially among women workers. That's a big problem, but there's plenty you can do to control it.
- **Injuries will go up, too,** because longer hours mean greater fatigue. So watch the injury curve.
- **That soft-drink slogan,** "The Pause That Refreshes," isn't an advertising man's hallucination. Organized rest periods, with proper snacks and soft drinks for a quick pickup, conserve energy.

WORK *vs* OUTPUT

Max D. Kossoris, America's leading authority on hours-and-productivity, answers your questions in a recorded interview:

1. Is there such a thing as an "ideal" or "optimum" work week for all plants, where you get the maximum return in output for the number of hours worked?

KOSSORIS: No, there is not. The question depends on many variables: Type of work force (are they men or women?); the age composition of the group; and—to probably even greater extent—the type of work that's involved.

In an operation that is almost automatic, the answer lies in how long the machine—not the operator—is kept running. Take the automatic screw machine. The operator feeds the machine while it is in motion, and it keeps on turning out work. So the question of the hours that the operator works at the machine is relatively unimportant. In fact, you get better production by keeping that machine going as long as you can, because the time that's required daily for stopping, starting, and cleaning it up is distributed over a larger volume of output.

But when the operator has control over the speed or the time it takes to run the machine, more depends on the operator than on the machine. And the human factor becomes even more important as you get over to operations that are entirely man-paced. Then everything depends on the speed of the operator. Your determining factors become something like this: Is it routinized operation? Is it light work or heavy work? Is it repetitive? What is the work environment? Are workers under incentive systems? And so on.

I think you can now see why I say there's no "one best work week" for everybody. The problem isn't that easy to solve.

2. Can plant operating executives use the results of your study to guide them in setting longer work schedules in the national emergency?

KOSSORIS: Yes, that's precisely why the study was made. What plant operating men are concerned with under emergency conditions is getting out as much production as they can. That's what we concentrated on in our studies. We wanted to know the relative effects of different lengths of hours on operators and on output in manufacturing plants.

During a war, of course, our problem is one of tight manpower. That's especially true now when we are superimposing a war activity on a full-blown peace economy. We have full employment now. If we pull the younger group out of our work force for military

Kossoris says:

" . . . five 10-hour days are not as effective as six 8-hour days."

service, and at the same time impose an additional production requirement on our civilian economy, our most distressing bottleneck will be manpower.

The manpower problem can be solved in several ways, and I suppose all of them will be used. We'll have to draw more women into the work force, as we did during the last war. We'll have to depend more on older people who have gone out of the work force. And, most of all, we must lengthen the work week.

The plants we studied during the last war did not follow any particular set pattern of hours. They jumped all over the lot. Their usual technique for lengthening the work week was to start with the 5-day week, 8 hours per day, then add a sixth day and sometimes a seventh day. Usually after reaching 6 days, keeping the daily hours at 8, they went to 9, 10, 11, and sometimes 12 hours per day. But, because we did have this variety of patterns, it was possible to determine what happens under different sets of circumstances.

We actually were in touch with over 800 plants in manufacturing industries to get down to 78 work groups that we could finally study under different conditions. Mostly our difficulty was one of inadequate records.

We also operated under several self-imposed restrictions to make the data valid. We would not, for example, study a group of workers under different schedules unless they had stayed at each pattern of hours at least six months and preferably a year. The reason for that is that it takes a little while for the full impact of a new schedule to be felt.

As workers change from a shorter to a longer schedule, the first few weeks or even months will reflect the operating experience that prevailed during the shorter schedule—in terms of efficiency, hourly output, absenteeism, and so on. But then, as fatigue begins to mount, the need for time out—for personal affairs, dental and medical care, and home problems—begins to make its impact.

After two or three months at the longer schedule of hours, workers begin to feel the effects. Then, and only then, do we begin to see the actual differences between the shorter and the longer schedules.

What that points up is that during a short spell, say during a short emergency, workers can maintain even under long hours the operating efficiency they had under the shorter schedule. But they can't maintain it for long. As weeks and months go by, efficiency keeps dropping until it stabilizes itself at some sort of plateau.

3. Is there any change in efficiency when the week is increased from 40 hours to 48?

Kossoris: Very little change. When hours stayed at eight per day and the employer merely added a sixth day—that is, Saturday work—the average hourly output remained almost the same. I'm talking about men now, not women. Absenteeism went up slightly; the injury rate went up slightly. But on the whole the 48-hour week rewarded the employer by increasing output almost proportionately to the increase in hours. He added 8 hours, which is a 20% increase over the 40, and got approximately 18% or 19% increase in weekly output.

The real difference comes when you increase hours beyond 8 per day. A 10-hour day, for example, maintained over 5 days, is not as effective as six 8-hour days, partly because of decreased efficiency that comes with the 10-hour day and partly because of higher absenteeism.

That's true of just about any manufacturing plant, assuming the same conditions that prevailed during our survey. The type of industry that's involved did not, in our study, appear to be as important as the type of physical demands upon the worker and the control he has over his operation. In almost every industry you'll find almost all these types of operations. Saying, "This is the rubber industry," or "This is furniture manufacturing," or "We make shells," doesn't make much difference. There are small shells and big ones, light ones and heavy ones. So the question of what you are making—except for the close identification of the process with the war effort, and its effect on morale—is not important.

For women workers, the principal effect of longer hours is absenteeism—assuming that state authorities will permit a deviation from the legal maximum daily and weekly hours. Just adding a sixth day in some of the plants we studied would jump the absenteeism of women from a weekday normal of 4% or 6% to something like 16%, 20%, and even 25% on Saturdays.

4. What happens to total output and output per man-hour when you increase the work week to *more* than 48 hours?

KOSSORIS: By and large, we found that hours beyond 48 or 50 brought about lower output per man-hour. It resulted in a higher absenteeism and a higher injury rate. When you put all that together you find that the output for that longer schedule, hour for hour, is lower than it is during the shorter work week.

Here's something that ought to be made clear, though. With a few extreme exceptions the higher hours, up to even 60 a week, resulted in more *total*

production than the shorter work week had. But you got that increase at a regressive rate. You got less and less production for the additional hours as the hours went up, until you hit the point at 65 or 70 where you actually began to lose.

As a general rule, as long as you stay below 60, you do increase total output. The question is: **Is it worth the cost?**

And remember this: The lowered efficiency is not something that you concentrate on the last day of the week, or the ninth hour, or the tenth, or the eleventh of the day. It is something that pervades the entire work day, the entire work week. The pace of the worker actually slows down, and that slower pace is characteristic of almost any time during the longer work week. What I'm trying to say is that he doesn't maintain a normal pace during five days of the week and then slow down on the sixth. He slows down on all six days, every one of them. He pretty much has to. Otherwise he wouldn't last.

I have some figures that show this very clearly. One plant we surveyed made shells. The plant was working a 6-day week, 10 hours a day, and in some cases 11 and 12—a 65- or 66-hour week on the whole. We discovered that total output under the very long work week, compared with the preceding shorter work week, actually could have been produced in about 42 or 43 hours. In other words, taking into account the lower hourly efficiency and the higher absenteeism and injuries in the 65- and 66-hour work week, the total output during the longer work week could have been produced by increasing the 40-hour work week to no more than 42 or 43 hours.

Certainly in that instance there could be no question about the morale of the work force. Making shells, they felt tightly locked into the war effort. But we weren't too surprised at the result. The British had run into the same thing.

A word of warning: This doesn't apply to daywork. Our studies were concerned primarily with people working under some kind of incentive system. There were two reasons for that. People who are operating under an incentive system have greater incentive to put out as much as they can because they get paid for what they put out. That isn't necessarily true under straight daywork.

The other reason was the availability of output records. Employers using incentive systems have to keep records of production. And it's easier to follow people through that kind of setup than it is when they have straight daywork. There's no need under straight daywork to keep account of what each worker produces.

We did study a few straight daywork operations. There we found that average hourly output did not vary much with the length of the work day or week. Absenteeism and injuries did, though.

Our studies turned up an interesting observation on labor costs under the impact of longer hours when there is an incentive to encourage workers to do their best. For work that was light, routinized, repetitive, and operator-paced, we found that when you got the 9- or 10-hour day, hours in excess of 48 or 50 resulted in approximately 2 hours of additional output for 3 hours' work. For heavy work, such as foundries and forge shops, where work is hot and conditions are not agreeable, we found that the hours in excess of 48 resulted in 1 hour's output for every 2 hours' work. That's the fatigue factor operating. What these figures really mean in terms of overtime pay above 48 hours a week is that for the routinized operations, at time-and-a-half rates, the employer actually paid 4½ hours' wages for 2 hours of output. And he paid even more—3 hours' wages for 1 hour's output—at heavy operations.

Kossoris explains:

> **" . . . a worker doesn't maintain a normal pace during five days of the week and then slow down on the sixth. He slows down on all of the six days."**

5. You said that the British also noticed the diminishing returns you get from long working hours. Did that tend to confirm your results?

KOSSORIS: It was the other way round, really. Ours confirmed theirs. Most of their surveys were made during the first World War when the work went to ungodly hours like 75, 80, and 84 hours per week. They discovered that the morale of the work force was being shot to pieces. So they progressively cut back the hours of work—with astonishing effect. They operated under somewhat different conditions, and their work habits and working speeds were somewhat different from ours. That was one reason why our survey was needed.

I have here the British study on output in the turning of aluminum fuse bodies. This is a survey that covered about 100 women. They worked successively 74½ hours per week, then 63½ hours, and finally 55½ hours. As hours were cut back, average output per hour kept increasing steadily. Weekly output for the 63½-hour week was the same as for the 74½-hour week. When they cut back to 55½ hours, they not only increased average output per hour but also exceeded *total output* of the two longer scheduled work weeks by 13%.

That was during the first war. However, first or second, the human body and the responses of workers don't change appreciably. The human being isn't a machine that you can turn on and work hour after hour, at a set rate of output. He doesn't work that

way. And the idea that, if necessary, you can make people work any number of hours in order to get output gets no support from these surveys.

6. Can you give us an idea of what to expect if you work a 7-day week?

KOSSORIS: Yes, and it's worth some emphasis right here. Our factories didn't resort extensively to Sunday work during the last war, but we did find a number of interesting illustrations of what happened when they did. In almost every instance we found that Sunday work didn't pay. It depressed the weekly level of output. And it also meant that people worked on Sunday at double pay and laid off some day during the week at straight-time pay. So they were paid *more* for *less* output. The employer—and more important, the war effort—didn't gain anything by it.

Here's the sort of thing you run into. A plant was operating on a wage incentive system but limiting its workers to 30% above base pay. That 30% ceiling was a mistake because it limited output. The plant was running 7 days a week for a period of months. Then they found absenteeism so high during the week that they first cut out one Sunday in every three, then two Sundays in every three, and finally cut out all Sunday work.

We found when they cut out one Sunday in three average hourly output per worker jumped something like 18%, and total weekly output jumped by about 7%. When they later cut out every other Sunday, the hourly output jumped about 27% above what it had been during the period in which every Sunday was worked, and total weekly output was 12% to 13% greater.

When every Sunday was cut out and the plant shifted to a straight 6-day week at 8 hours per day, we came out with approximately 35% or 36% higher hourly efficiency and approximately 12% higher output than when they operated 7 days. In other words, when they dropped from 7 days to 6 days, they actually produced about 12% more. And that Sunday was, of course, at double pay.

There was one other situation which was interesting because it showed a somewhat different factor at work. The workers in this plant were in two groups —one operating lathes, an almost automatic operation, and the other on a straight assembly job. The plant had been running 7 days and was considering shifting over to 6. They took a vote; the management left it up to the workers themselves. The people at the assembly line voted to take out Sunday, even though they knew they would lose the pay for that day. The people operating the lathes voted in favor of continuing Sunday work.

The reason for that was interesting. The people operating the lathes were older men. The work was not of a type that required any particular exertion or great attention to what they were doing, except at intervals. They could sit, for example, and talk with each other, or even read while the work on the machine was going on. Furthermore, being older men with grown children they didn't have any social activities as the younger folks did. They were more concerned with getting the additional pay than they were in getting time off.

Kossoris says:

"... in almost every instance we found Sunday work didn't pay. It depressed the weekly level of output."

7. To what extent can you expect absenteeism and labor turnover to go up with longer daily and weekly hours?

KOSSORIS: You can expect absenteeism to go up —and go up fairly sharply—as hours run up to 54 and 60 during a full 6-day week. The question of absenteeism is different for men and for women. Women under almost any schedule of hours will have a higher absenteeism rate than men. That's true whether it's a 40-hour week or a 48-hour week. They lose more time because of illness and household duties. Many of them have children to take care of, shopping responsibilities, and so on, which men don't have to concern themselves with.

Of course, if you work a 6-day week, you have a decided jump in absenteeism on the sixth day, as I've already said. Also, as hours go up, workers get to the point where they have to get more time out for rest than they can get in one Sunday. And they'll take it.

As to labor turnover, you can't take it out of its context. During the national emergency, where would the men go? If they're operating in war plants they get fairly high earnings and also exemptions that may be necessary to get high war production. And if you limit their means of moving around, as plants probably will be limited in terms of priority on workers, it won't be so easy to jump from one job to another. In normal times, longer hours might raise turnover. But in war, they probably won't.

8. What is the relationship between longer hours and industrial accidents?

KOSSORIS: As a general rule, the effect of longer hours is to increase the frequency rate of injuries. There are a number of reasons for that. One reason

is that as workers are exposed to greater fatigue the work habits become somewhat impaired. They don't operate as carefully as they normally would, and more injuries result. Another reason is that they are exposed to the hazard of being injured for a longer period of time. You might guess that if everything else were equal, the relationship of injuries to hours worked ought to remain the same with longer hours. Actually it increases rather sharply because of the fatigue element.

There's still another reason. When our plants expand their activities during an emergency period, their supervision tends to be spread more thinly. Furthermore they bring into the plant a lot of people who normally would not work in that plant. That's a pregnant combination—people unaccustomed to the hazards of the industry or of the shop, people who have to work longer hours, and who are not given the same degree of close supervision that the plant normally would have.

Sometimes a well-managed safety program will hold the frequency rate of injuries during the longer work week to approximately the same level as in the shorter week. As a general rule, though, it doesn't work that way. Furthermore, during a war period, against the stern advice of the safety people, employers tend to put more and more emphasis on output and devote less attention to the human element involved. As hours increase, you can certainly expect a higher incidence of injuries out of proportion to the additional hours worked.

How much the rate will rise varies considerably because it does depend on all the different factors that I mentioned. Of course, a plant with a good safety program in operation will do better than a plant without one.

Interestingly, men are just as vulnerable to accidents as women. There's no sex difference here, as in absenteeism. If the men are exposed to the same hazards, they get injured as frequently.

I might tell this little story about incidence of injuries. It has no bearing on the number of women in the plant, but it certainly makes a difference as to the kind of women you employ. In one plant, we found a big increase in eye injuries due to welding flashes. In checking, we found the plant had put a number of good-looking lady welders into the shop, and the men apparently didn't guard their eyes as well as they should have—or would have otherwise. In another plant, we found that a good-looking nurse seemed to draw more minor injuries to the first aid room. Now I'm not arguing that employers ought not to hire good-looking nurses. If someone gets hurt, that's probably the least the employer can do for him.

9. Do you think it's wise to go in for rest periods if you schedule a longer work week?

KOSSORIS: Decidedly so. Rest periods have been found to be desirable even under the 40-hour week, Certainly they are more so with a lengthened work week and work day. Breaks in the morning and afternoon are certainly desirable, particularly if during the break some facilities are afforded the employees to take food, preferably the kind of food that provides quick energy and a quick pickup.

If they don't get the breaks, they'll probably take them. It's better to have these rest periods on an organized basis. That way you can keep your plant running more effectively without having the stoppage in one place interfering with the operations in another place.

Experience has shown that rest periods tend to improve efficiency. This is something that not enough employers are appreciating. But it's important that they should, particularly when they go to an extended work week.

10. Say you're advising an employer who decides that a longer work week is necessary now. Will it make any difference whether he puts in the longer schedule suddenly or gradually?

KOSSORIS: We'll assume he's working 40 hours a week now and wants to go to 48. Having a sixth day will not make too much difference. I think the best thing to do would be to add a half-day Saturday, then go up to a full day Saturday. Do that rather than increase daily hours first. Going from 40 to 44, then later to 48, sort of cushions the effect. And if you do give workers that extra half-day to take care of their personal needs, it means less time taken out during the work week. And it also gives the workers a day and a half of rest. There's a psychological factor in tightening up as you need to rather than slapping down all at once.

Beyond 48 hours, the employer knows he will get more total output at increasingly higher cost because of overtime pay rates and because of the regression in efficiency that we've discussed. But let's assume he still wants that extra output, whatever the cost.

As I've indicated, Sunday work should not be in the picture. That leaves us with the question of how you divide, say, 54 hours among 6 days. It could be done by five 10-hour days and a half-day on Saturday. Or it could be done by six 9-hour days. I think in terms of overall efficiency I would prefer the six 9-hour days. I think the longer the work day is extended, the worse the efficiency gets. Now that's again conditioned by what I said at the outset—the degree of control which the worker has over his pace of operation, the extent to which his job is man-paced rather than machine-paced.

The impact of adding 14 hours a week in one package—to go from 40 to 54—would be pretty bad. A month or six weeks after it was done, the plant would notice a decided slump in efficiency, and a sharp jump in absenteeism and a higher injury rate—a decidedly higher injury rate.

In a heavy type of operation, I would increase the work week slowly. In a light type of man-paced operation, I think you could move faster. But you can readily see what would happen in a forge shop, let's say, involving heavy and hot work, if you suddenly jumped the work from 40 hours a week to 54. It wouldn't take more than two weeks before you noticed the bad results.

CIGARETTE PAPER • New Way: 200 rolls on expendable pallet. Old way: 10 rolls in corrugated container. *Increase in size of unit load:* **20 *times.***

LABELS • New Way: 660,000 labels on expendable pallet. Old way: 20,000 labels in corrugated container. *Increase in size of unit load:* **33 *times.***

Getting Our Supplies on Pallets Saves Labor, Materials, Space

By W. C. FOLEY
Vice President, Philip Morris & Company, Ltd., Inc.
Richmond, Virginia

VISUALIZE THE ADVANTAGES you could get if your supplies were delivered in palletized unit loads. That's what we did at Philip Morris. Then we went to work on that idea with our suppliers. As of today, we're getting about 70% of our incoming supplies on pallets. Unit loads are as much as 50 times bigger than they used to be.

HERE'S WHAT THE NEW METHOD HAS DONE...

FOR PHILIP MORRIS: Cut loss of material damaged in shipping and handling.
Lowered cost of one supply item. Lowered labor costs.
Reducing floor space for supplies—by stacking.
Simplified inventory checking. Made good housekeeping easier.
Eliminated congestion. Improved handling in manufacturing.
Bolstered employee morale. Reduced errors.

FOR SUPPLIERS: Speeded handling and delivery.

FOR CARRIERS: Cut turn-around time.

CELLOPHANE · **New Way:** 208 rolls on expendable pallet. Old way: 6 rolls in corrugated container. *Increase in size of unit load*: 35 *times.*

CARTONS · **New Way:** 36,000 cartons on reusable pallet. Old way: 1000 cartons in a corrugated container. *Increase in size of unit load*: 36 *times.*

SHIPPING CONTAINERS · **New way:** 360 containers on expendable pallet. Old way: 15 or 20 containers tied in a bundle. *Increase in unit load*: 18 *to* 20 *times.*

SIZE OF UNIT LOADS RECEIVED

		Before Palletizing	After Palletizing
▶ 1	CIGARETTE PAPER	10 ROLLS	200 ROLLS
▶ 2	LABELS	20,000	660,000
▶ 3	CELLOPHANE	6 ROLLS	208 ROLLS
▶ 4	CARTONS	1000	36,000
▶ 5	SHIPPING CONTAINERS	15 to 20	360
	WAX PAPER	2 or 3 ROLLS	27 ROLLS
	FOIL	2 ROLLS	108 ROLLS

Turn to page 76 for a step-by-step description of how we got these results ——— ▶

GETTING SUPPLIES ON PALLETS . . . begins on page 74

SIX-STEP PROCEDURE THAT BROUGHT SAVINGS IN LABOR, MATERIAL, AND SPACE FOR PHILIP MORRIS

1. We Assembled the Facts

We had to know the limitations of our facilities for handling unit loads. But let me put in some advice right here: Don't let discouragement overtake you in this first step. Some details may make the job look too tough, but all of them won't be against you. Just make note of those that appear to offer no difficulties and consider what you might do to get around the others. We let other people help us with our problems, too—people in our own company and equipment suppliers. Remember this: You can pay for some building and equipment changes with part of your savings.

The information we collected covered both facilities and supplies, including:

a. Facilities. Floor-load capacities, elevator capacities; width and height clearances throughout the handling area; tiering height; dimensions of motor truck bodies (sometimes overlooked).

b. Supplies. Volume of each item used; names and locations (distance) of suppliers; carriers; description of present shipping units.

2. We Discussed With Suppliers

We had a rough idea now of what we could do at our end. We wanted to know what our suppliers could and would do at their ends. We did not hand them specifications for palletized unit loads. We just discussed the idea with them—and found them receptive. Two had already been working on plans for palletized shipments in order to cut their own costs.

3. We Purchased Equipment

Assured of cooperation by our suppliers, we took up the questions of what type and how much equipment. We accepted help on this problem, too, particularly from representatives of the equipment manufacturers. We selected a standard fork truck that fitted the facility limitations discussed in Step 1.

Fortunately we didn't have to make any building changes. The elevator capacity was the deciding factor; it was adequate for 2500-lb. loads, a sizable load of any of the supplies we use. But we're sure we could have justified some changes, had they been necessary.

4. We Initiated Trial Shipments

We decided to take this important step in easy stages. We don't regret that decision. It gave us time for thorough and prompt attention to every questionable detail.

As I said, two of our suppliers had independently begun work on palletizing shipments. One of these supplied to us the item we use in largest volume, so we started there.

We had the supplier's representatives come to our plant to see our facilities and to arrive at an approximate size for the unit load. They developed it from there and gave us a tentative specification to check. Then we ordered a trial shipment of a few palletized units.

Minor changes, suggested by this experience, were made in other trial shipments. When both parties were satisfied that we had the most practical palletized unit load, we were ready for the next step.

5. We Adopted Specifications

We wrote final specifications to describe the palletized unit load agreed upon. Copies were distributed to all interested personnel of both companies to assure compliance. All specifications included:

a. Title (describes material)
b. Packing specification number
c. Supersedes packing specification number (provides chronological record)
d. Reason for change
e. Date approved
f. Packing or shipping unit (describes details of palletized unit load and refers to drawings and photographs on specifications)
g. Information to appear on outside of each packing unit: packing specification number, article specification number, purchase order number, and quantity of rolls contained in unit
(All information required to simplify clerical functions)
h. Remarks
The last item includes the responsibilities of the parties for pallets and specification changes, as well as other pertinent notes. For example, here's what was written into one:

"**A.** These pallets are expendable; i.e., it is not necessary to return same to supplier. However, if the supplier desires, a credit schedule for returned packing and/or returned pallets may be submitted to Philip Morris & Co. Ltd. Inc., to be used then only if both parties desire same to be returned to supplier for credit. In any event, no additional charge over present method of packing is incurred by Philip Morris with this palletized packing.

"**B.** Supplier is not bound to the packing arrangement specified herein. The primary purpose of this specification is to provide the purchaser with an accurate description of the packing used by the supplier, so that same may be specified by number on purchase order. Whenever this packing is changed by the supplier, the purchaser is to be notified immediately, so the records and packing specification number may be revised accordingly."

6. We Improved the System

Availability and price of packaging materials change. New materials emerge. New methods are conceived. Transportation facilities and procedures change. We must continually re-examine our specifications to find better ways to meet changing conditions.

Right now we're reconsidering the economic comparison of expendable and reusable wood pallets on some shipments, because of increased prices. We follow the same practice on changes that were used for the original development.

We haven't completed this program yet. The less difficult materials — about 70% of total — are on pallets when received. We put everything else on pallets when we unload it. That, too, pays off; we get most of the same benefits already listed.

Before we palletize any material, one condition must be met: Cost of supplies delivered must be no higher. (On one item the price was reduced.) So far we've maintained that position. That rule makes palletization of the rest of the supplies more difficult. Some may never be palletized. But we're working on them.

IS YOUR PLANT GETTING FULL OR PART-TIME PROTECTION?

By CAPTAIN J. C. MANSFIELD
Sturtevant Division, Westinghouse Electric Corporation, Boston

TOO MANY PEOPLE still think of plant guards as old trusted employees—men who are kept on as guards out of courtesy after their productive days are past and until they qualify for retirement.

Nothing could be more inaccurate. At Westinghouse we're hiring World War II veterans as guards. Plant guarding is a young man's job.

You don't get good plant guards just by setting stiff application requirements. You must screen the applicants thoroughly. You must train the most promising ones well and you must give them frequent refresher courses.

When you realize that the plant guard spends two-thirds of his time by himself, or with only a small working force present, you see the importance of good, specialized training.

Your plant guard is often the first person that a potential customer or salesman sees when he calls at your plant. That first impression is important. Much of the impression rests with the guard himself—his personality. Good training will guarantee that the visitor gets the impression you want him to.

How Westinghouse trains plant guards . . . turn the page

PLANT PROTECTION... begins on page 77

QUALIFICATIONS

Intelligence, courtesy, cleanliness, neatness, honesty, and a sense of responsibility are some of the qualifications for a good prospective plant guard.

It's generally accepted that a married man makes the best guard. He's more apt to accept responsibility. There are, of course, exceptions to this rule. An applicant must above all else be honest and sincere. Selection of replacements to the force from within the plant makes training easier. The man will know the plant, its products, its policies.

But remember, a man coming onto the force from within the plant may bring loyalties and obligations from his old work area. This can be troublesome. The fact that the applicant has been a former city or state police officer does not always mean that he'll be an efficient plant guard. It does mean, however, that he has accepted responsibility in the past.

MARRIED MEN often make the best plant guards. You can be sure of their willingness to accept responsibility.

TRAINING

Training determines whether you get full or part-time protection in the plant. After the guard applicant has been accepted, he is given the training manual to study. It tells him a little about the plant, describes identification badges, passes, and the various forms he will use. It tells correct procedure for performing his duties.

The first few days are spent at the gate with an older guard. Next, the rookie accompanies one of the guards on regular patrols. When we feel he knows the routes and duties, he makes it alone.

Later he is assigned to one of the lesser posts—parking lot, messenger service, railroad gate.

Every week he attends classes in first aid, safety, fire prevention, and use of fire arms.

Not until he has completed his training and passed all tests is he given a uniform.

STUDYING GUARD MANUAL will give the applicant an insight into his job . . . rules, forms, duties.

DUTIES

Duties of the plant guards will vary with the plant. But in any plant a guard's foremost duty is to know first aid—at least the standard Red Cross first aid course. The guard is your first aid link during those hours that the medical department is normally closed —the second and third shifts.

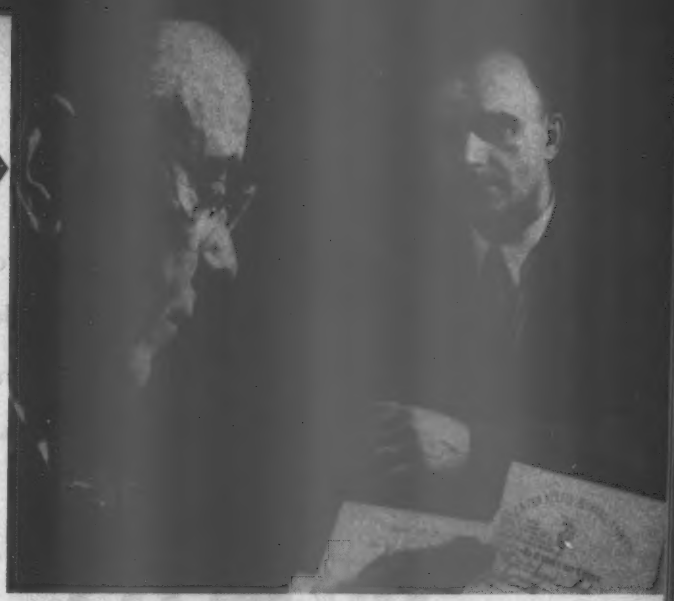
Since fire is your primary worry, the guard must know the location of fire hydrants, shut-offs, extinguishers, and other fire fighting equipment.

Safety of personnel also falls to the guard. He should report any accident hazard he sees on his nightly tours to the safety director.

Patrols should take the guard to hazardous areas. Call stations should be located in areas where extra valuable or hazardous materials are stored. It's a good idea to change the guard's route often to avoid a place-time association.

ARTIFICIAL RESPIRATION, on the second shift while the dispensary is closed, is given by the plant guards.

PERSONAL CLEANLINESS and neatness is a must. Your guard gives visitor their first impression of your plant.



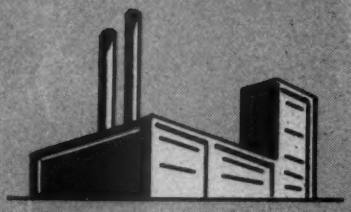
PERSONAL QUALIFICATIONS, however good they are, won't make a good guard. But they help you screen applicants.

GUIDED TOURS through the plant with old guards start the rookie on his way. Later he'll make it alone.

FIRST AID CLASSES teach and refresh the guard. He's your aid man two-thirds of the time.

FIRE EXTINGUISHER couldn't be reached in case of emergency. Crates block the way. Guard notes the error.

CALL BOXES are put in out-of-the-way places. Boxes should be placed where dangerous material is stored.



If we are to do the tremendous production job that now confronts us, we ought to know how we got where we are today—and how we can go on from strength to strength. Here's a timely analysis, by objective British observers, of . . .

WHAT MAKES AMERICA'S INDUSTRY STRONG

A report by Harry Lee Waddell, Editor of FACTORY, who visited Great Britain recently as a consultant to the Anglo-American Council on Productivity. The Council's principal activity is to sponsor visits of teams of British managers and workers to investigate for themselves the causes of American industry's high productivity. This analysis is based on reports issued by the first fifteen teams.

THE FATE OF AMERICA depends on industry's ability to turn out more goods per man-hour—whether we get into global war or must support a huge military preparedness effort year after year after year.

Our high productivity is now the wonder of the world. It must go even higher. To accomplish this, we need to be sure that we know the underlying reasons for our present industrial might.

What is the base on which the productivity of American industry rests? What features of our system must we guard and improve if our productivity is to continue to grow?

These are questions that we must answer as a nation. And every plant manager is called on to answer them in his daily decisions.

But to keep a clear view of the real bases of high productivity is not easy. We are so close to the problems, our prejudices and political beliefs are bound to be so strong, that sometimes we wonder if we have lost sight of the important issues.

Now comes a powerful assist. In the last two years nearly 500 skilled observers—seeking the answers to exactly the questions we have raised—have been investigating American industry. They are members of teams from more than 30 British industries. The teams are made up of people from management, technology, and labor. Each team has spent six weeks in the United States, plus many more weeks to prepare for the intensified study and then to digest what it learned.

This is the aim of the teams: to find out what makes America's productivity higher than Britain's, and then put that knowledge to work in England.

So far, about half the teams have reported their findings. There are two surprising things about them:

1. While they have dealt at length with the technology of the various industries, they have put great stress on labor attitudes, management techniques, the social and economic "climate," as vital factors in American industry's productivity.

2. Despite the controversial nature of such subjects, each team report has been unanimous.

LESSONS FOR AMERICA IN THE BRITISH REPORTS

On the surface, the British teams' observations of American attitudes and practices may seem too complimentary. We aren't really that good. But remember that the British teams were looking at us to find why we have progressed as far as we have. They weren't trying to find whether—or how— we could do better. Accepted in that light, the British comments are an excellent guide to the sources of high productivity. **They give American industry, in effect, this challenge: These are your great strengths. If you think you can be even stronger, here's where to put your effort.**

Here's a summary of what the first 15 British team reports have to say about the "common denominator" factors in U. S. productivity—causes broader than the technology of each specific industry.

AMERICAN ATTITUDES THAT PROMOTE HIGH PRODUCTIVITY

Productivity consciousness

This is the phrase that many of the British teams use to describe a belief in high productivity—that is, high output per man-hour. Here is how some of them comment:

Steel Founding Team: "There is a wide-spread 'productivity consciousness' in the U.S.A. and recognition that high productivity is a benefit to all concerned."

Cotton Yarn Doubling Team: "High productivity is recognized as a prerequisite for maintaining a high standard of living. Here is the mainspring of action of managements and operatives alike. In other words, the advantages of high productivity have been realized by experience, and it is reasonable to assume that, by further raising productivity, the standard of living can be raised still higher."

Every one of the first 15 teams comments along this line. Two tie this attitude to competition:

Cotton Spinning Team: "Every employee from president to operative is production-minded, owing to the realization that high productivity means cost reduction and survival of the firm in a competitive market."

Cotton Yarn Doubling Team: U. S. workers are aware "that the advantage of increased productivity shall come to them indirectly in the form of lower prices and a reduced cost of living . . . . In a free competitive market, prices are sooner or later brought into line with the costs of the most efficient manufacturer."

Competition

The British investigators found that "the keenly competitive spirit . . . is inseparable from modern America," as the Steel Founding Team noted.

This is what some of the British teams say about the effects of competition on U. S. management:

Grey Ironfounders Team: "Fiercely competitive conditions exist between the various iron foundries. Several instances were quoted in which orders held for some years had been lost to a competitor by a small margin in price, and this constant pressure on a foundry to reduce costs stimulates management in its efforts to seek improved product or improved methods of production."

Cotton Spinning Team: Managements will try new ideas and devices "as an insurance against being left behind in the [competitive] race, and they do not mind having occasional failures."

And the effect of competition on labor:

Internal Combustion Engines Team: "The belief is held by workers at all levels that it is only by the competitive spirit in industry that maximum efficiency can be attained and, through efficiency, that the high American standard of life can be maintained and improved."

Grey Ironfounders Team: "The competitive spirit exists at all levels and is exhibited not only by a worker aiming at producing a job a little faster than

his fellow worker, but also by men taking pains to qualify for more skilled and higher-rated jobs."

Eagerness to try new ideas

American industry is quick to adopt new methods and machines, most teams reported:

Diesel Locomotives Team: "It is common ground among Americans that, if a new method costs less, then it ought to be adopted quickly. There is, therefore, a willingness to try out anything hopeful and any natural resistance there may be to fresh ideas is more easily overcome."

Pressed Metal Team: "American plants visited were found to be much more up to date with their equipment [than the British]. . . . The American industrialist [insists] on having the latest equipment."

Steel Founding Team: "Americans appear to be far less interested in why something should *not* be done than in the important reasons why it *should*—so they get moving while their British counterparts wait for further information."

Receptiveness to new ideas is not confined to management, the British noted. For instance:

Drop Forging Team: "The man in the shop . . . took an interest in trying out new ideas to cut costs."

Rayon Weaving Team: "The team was struck by the ready acceptance by all of change in working conditions which would lead to greater productivity."

Exchange of information

Closely akin to the eagerness of Americans to try new ideas is their willingness to exchange ideas—even among competitors. A typical British comment:

Simplification in Industry Team: "We found a greater readiness amongst American manufacturers to share their technical knowledge and to discuss production methods with other manufacturers, whether competitors or not, than is common in the United Kingdom. It is their conviction that all derive great benefit from the interchange."

One result of this willingness to exchange new ideas is noted by the

Materials Handling Team: "The technical press in America appears to receive more effective cooperation from users and manufacturers of handling equipment than in Britain and is able to publish cost data. This helps to obtain the widest degree of utilization of proved methods and equipment."

Teamwork

Nearly every one of the 15 British reports noted a spirit of teamwork and cooperation in American industry—within the plant, and in companies' relations with customers and suppliers. As examples:

Internal Combustion Engines Team: "Every effort is made to weld the [U. S.] works into a team . . . We felt that this team spirit . . . is a major factor in the success of the American approach to production."

Drop Forging Team: "Cooperation exists between the user and the manufacturer . . . This often results in modifications in design which in turn permit reasonable prices to be charged for articles that might otherwise be expensive."

Men's Clothing Team: "The degree of cooperation within management itself and between worker and fellow worker is of markedly high order."

Grey Ironfounders Team: "There is far greater readiness among workers to cooperate as a team [in America, compared with Britain]."

Labor attitude to industrial progress

By contrast with British conditions, American workers and unions are generally willing to go along with more efficient methods, the teams reported. Some comments:

Drop Forging Team: "[U.S.] labor unions did not discourage technical changes and the introduction of new methods, partly because they felt that such changes were inevitable, but mainly because they believed that they gave the only real hope of improving the workers' standard of living . . .

"The unions had no support for the worker who did not pull his weight."

Grey Ironfounders Team: "Workers are . . . willing . . . to adopt new methods of production provided the union is satisfied that the pricing of the work is fair. . . . The American worker realizes that his personal prosperity is dependent upon the success of the company employing him."

Cotton Weaving Team: "Union contracts [in the U.S.] allow the managements to change work-loads as conditions alter. . . . In Britain, work-loads tend to be maintained rigidly according to custom."

MANAGEMENT CONTRIBUTION TO HIGH PRODUCTIVITY

Of the many practices by American industrial management that have raised productivity, the most important seen by the British teams include:

Mechanization

This involves the use of mechanical muscles not only for direct production operations, but also for materials handling. Some British comments:

Steel Founding Team: "The physical basis of high production [in America] is the use of machines. . . . The use of machines presupposes the use of more power per man. . . . Power assistance is to be found everywhere."

Building Team: "Mechanization is employed much more effectively and more continuously in America [than in Britain]."

Fertilizers Team: "American higher productivity . . . is clearly due to greater mechanization of their handling equipment."

Pressed Metal Team: "The fullest use is made [in the U.S.] of conveyors of all types. . . . It is this particular technique probably more than any other which makes American productivity greater than our own."

Materials Handling Team: "Better materials handling offers a greater opportunity to cut costs and to increase productivity than any other single factor."

Specialization, simplification, standardization

These are the British teams' terms for the practice of confining individual plants to narrow ranges of products, of reducing the number of types and varieties within that range, and of applying uniform specifications to various components.

American manufacturers have gone much further along these lines than the British—especially in specialization and simplification. Some comments that sum up the point:

Internal Combustion Engines Team: "The American manufacturer . . . has . . . a clearer conception of the range of products he is prepared to build."

Steel Founding Team: "Knowing that they can keep prices down only if they specialize in certain lines . . . they [American managements] sell these lines at all times in preference to less welcome designs. . . . The private likes and dislikes of individual engineers have had to give way to the economic compulsion of lower prices for standardized articles."

Simplification in Industry Team: "One of the main reasons for the high productivity and low cost which are characteristic of [U.S.] industry . . . is the ruthless elimination of unnecessary variety. . . . Simplification prepares the way for important changes in method and it is those changes in method which produce the desired advantages."

Labor utilization

American management not only strives to save labor, but to break difficult jobs down so unskilled workers can do them. Some comments:

Pressed Metal Team: "The proportion of skilled men in American press plants is less than in Britain. . . . The constant trend of American industrial research is to break down skilled manual operations into machine operations that can be performed by unskilled or semi-skilled workers . . . This tends to produce a less skilled but more specialized and fully efficient operator."

Cotton Yarn Doubling Team: "Greater productivity in American mills is not due to any obviously greater personal effort or skill on the part of the American compared with British operatives."

U. S. management sees to it that the skilled men it does have are serviced by power tools and by unskilled workers—so that the utmost use can be made of the skilled men's special abilities, several teams noted. For example:

Grey Ironfounders Team: "One of the reasons for the higher productivity in the [U.S.] foundries was evident. . . . They have realized this work [the menial jobs] can be done more expeditiously and economically by lower-rated labor, with the judicious addition of mechanical appliances."

ECONOMIC CONDITIONS FAVORING HIGH PRODUCTIVITY

The British teams saw important contrasts in the American and English levels of taxation, the availability of consumer goods, and the availability of industrial supplies, equipment, and power.

Personal and corporate taxes

The British found that our personal income tax rates do not rise so steeply as theirs—and thus are not so much a brake on the incentive to higher productivity. Here are typical statements:

Steel Founding Team: "Taxation in America is not so high as to nullify, or nearly nullify, the extra reward for extra effort."

Men's Clothing Team: "In America a slight increase in a worker's gross earnings does not result in a relatively large increase in the amount of income tax which he must pay. If, by expending extra effort, he increases his earnings, he is left with a fair reward."

Grey Ironfounders Team: "At all normal wage levels the incidence of the [U.S. personal income] tax is strictly proportionate to earnings, and . . . no sudden increase in [the rate of] tax deductions occurs at any level reached by even a very highly paid production worker. In no case did the team find any evidence of any restriction of output due to the incidence of income tax."

The British found that lower corporate income tax rates in the U. S. are important, too:

Cotton Spinning Team: Among the reasons for high U.S. productivity is "the allocation of considerable sums from profits, which are not so heavily taxed as in England, for the purchase of machinery."

Grey Ironfounders Team: "Direct taxation of [British] companies may take up to 62% of profits. This, together with dividend limitation, deprives management of a powerful and traditional incentive."

Availability of consumer goods

The incentive to earn more is greater for the worker if there are goods to buy with the extra money—and if a deep desire to own them has been aroused. Many of the teams note this. Among them:

Men's Clothing Team: "The American worker has a great incentive to earn as much as possible because, with the necessary income, he can purchase things which are still in short supply in Britain. . . . The selling methods generally practiced in the U.S. also create a keen desire on the part of the worker and his family to achieve a high standard of living."

Internal Combustion Engines Team: "There is a widespread aspiration in the U.S. for a high standard of living. . . . [It] is sustained by an enormously greater quantity and variety of consumer goods available to the American than the British shopper . . . The desire of the average American for new things, and his belief that the production of more products raises the standard of living, is a noteworthy feature affecting productivity."

Availability of industrial supplies, equipment, and power

America's natural resources of course make most raw materials more abundant. But the British noted that—contrasted with their present situation—industrial equipment is far more readily available in America. Most important, they pointed out that the power to support increased mechanization is on tap for U.S. industry. For instance:

Grey Ironfounders Team: "We are dismayed by the pessimistic official forecasts of the rate at which new electrical generating plant will be brought into use. We urge that a very special effort be made in this field, as without more power every industry must curb its mechanical developments. . . . The American foundries use about twice as much electricity per ton as comparable British foundries."

PLANNING IN PHILADELPHIA

In engineering office at Electric Storage Battery Company, four members of the design staff rally 'round a floor plan of the new Atlanta plant. They're watching Plant Engineer Wilbur Ferris (left) use a progress photograph to demonstrate a point he wants to make in connection with construction work that's under way. This kind of briefing prevents errors, saves time and money.

PROGRESS PHOTOS

They save money at the job; cut time needed to interpret blueprints; hold errors to minimum

THEY ARE SURE at Electric Storage Battery Company that Confucius was right. So sure that they took 600 pictures of the construction work recently completed at their new Atlanta plant. Every step in the progress, from drawing board to moving day, was recorded. These photographs resulted in real cash savings to the company during construction. They will continue to have value for the lifetime of the plant. Here's why:

Before work began, pictures were taken at other company plants to show how various equipment was installed. These acquainted the architect, contractor, and workmen with piping and ventilation setups, clearance problems, and typical finished installations. Machinery suppliers who saw the pictures were better prepared to translate specs into installations. The time saved and errors eliminated by this briefing saved many dollars.

Progress photographs were included as part of the field supervisor's weekly report to the home plant in Philadelphia. With only one company representative continuously on the construction site, company officials were kept in close touch with building operations by remote control. And it's a lot cheaper to buy

ACTION IN ATLANTA

A. F. DeLong, engineering field supervisor, plans an equipment installation with the help of a photograph from another Exide plant.

film than to have more company personnel on the site.

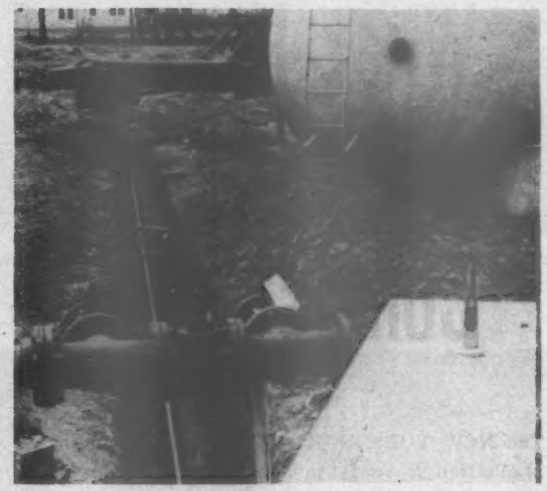
These pictures were especially valuable to plant design engineers, who might never see the branch plant. They could see the results of their work, and study any differences between their drawings and actual installations. And when the field supervisor needed authority to make design changes, pictures of the affected area were sent along with the written proposal. With this as an aid to understanding the problem, design engineers and company officials could give quicker and more accurate answers.

Imagine finding a mistake in wiring at a plant 650 miles away! Exide engineers did just this while reviewing progress photographs. And such pictures can be used as evidence in negotiating settlements with contractors because of defective workmanship.

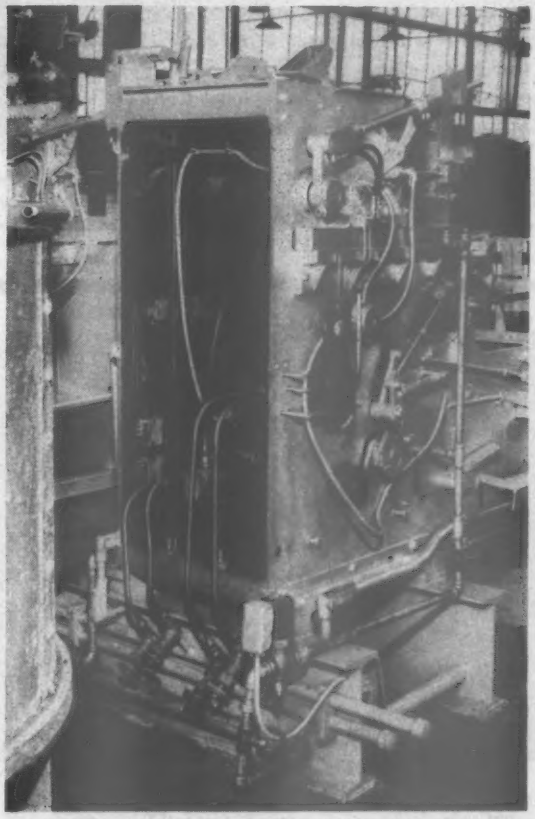
Finally, it's obvious how much simpler changes or repair of buried pipelines or covered wiring are going to be with a complete set of pictures of what they looked like while still exposed.

Of course, the photographs only supplement written records and blueprints. They're really an addition to normal records. But they're an addition that has paid off in dollars and cents for Exide.

Here are two typical progress photographs that may someday be worth their weight in gold.



HOW MUCH SIMPLER for Exide, with this photograph on file, to change or repair its gas mains—should it ever be necessary to do either.



PICTURE SHOWS how grid casting machine is set up, reveals maze of piping for electric power, lubricating oil, water, hydraulic fluid, and gas.

CASE STUDY IN CIVIL DEFENSE

UNIDENTIFIED PLANES SPOTTED

What Happens When Alert Comes

The NEW YORK PORT AUTHORITY Building in Manhattan is ready to handle the problems of an air raid. Col. Lawrence Wilkinson, director of the New York State Civil Defense Commission, hails the Port Authority program as a model for plants throughout the country.

Here is what happens in the huge manufacturing-warehouse-office building when a "yellow" alert comes. That warning from local Civil Defense staff means unidentified planes have been spotted – an air raid is possible.

WARNING SIGNAL, received on panel light (upper left), is immediately relayed by control room operator to key people and supervisors.

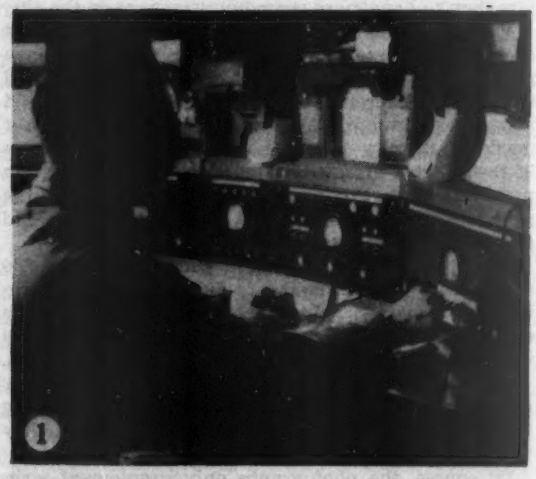
FIRST TO HEAR is the Building Superintendent, who checks last-minute details with aides. To prevent jitters, employees are not alerted until red signal.

ATTACK IS CERTAIN

What Happens During Raid

Now it's time for workers throughout the building to head for shelter. The "red" warning has followed the yellow alert.

The disaster plan shifts into high gear. The next pictures show how people are evacuated.



EMERGENCY SIGNAL is broadcast throughout building. Key inserted by operator automatically sends coded alarm over fire gong system.

NURSES PROCEED to fully equipped first aid station in sub-basement. A special elevator is reserved for them.

AUXILIARY POWER for lighting – the batteries of this electric truck – is rushed to sub-basement. Batteries will be hooked to first aid station's standby d.c. lighting circuit.

MAINTENANCE STAFF, alerted by supervisors, report to control room desk. They'll be ready for fire fighting and damage-control assignments if the attack signal comes.

EVACUATION BEGINS. Wardens supervise removal of people in groups of 50 over designated routes. Group above is entering a truck pit that serves as a shelter on the fourth floor. All employees can't get to the basement quickly, and these sections of the building are well protected.

Turn the page

CASE STUDY IN CIVIL DEFENSE . . . begins on page 86

TOP-FLOOR GROUPS, since they're more exposed, are evacuated to basement. A warden directs these people to elevator assigned to their area.

ALTERNATE ROUTES are assigned to each group. These people, forced to use their auxiliary route, are guided by signs to the basement.

BATTLE STATIONS FOR EMERGENCY STAFF

FLOOR SPOTTERS, such as this man, are stationed throughout the building to report damage over intercom phones to the central control room.

FIRE-FIGHTING CREWS rush to scene of action when notified by the control room. This crew is going up by elevator with a fire wagon – a special hand truck that is fully equipped as a portable fire fighting station.

ENTERING SHELTER a few minutes after leaving their work area, these people will be protected from blast, flash, and radiation 20 feet below ground level. Final evacuation of all personnel is completed 7 minutes after receipt of the "red" warning. They'll sit tight until the all-clear.

ELECTRICAL FOREMAN cuts power to damaged sector. He stands by, ready to trip other breakers at a moment's notice.

MAINTENANCE MAN shuts valve of shattered steam line. Critical valves are all plainly tagged for rapid identification.

MEDICAL DEPARTMENT takes care of casualties. All emergency staff people have also been trained in first aid treatment.

Turn the page

How to Protect Your People and Property in an Air Raid

By ALBERT C. WARNER
Superintendent, Port Authority Building
New York City

ATOMIC ATTACK MAY COME AT ANY TIME. Does your plant have an overall plan to evacuate personnel to safety in a matter of minutes, to maintain vital services, and to control plant damage?

The Port Authority Building does have its house in order. Our recently completed disaster plan has been acclaimed by State Civil Defense authorities as an outstanding pattern for personnel protection—a model that can be utilized by plants throughout the country.

Here are basic steps to guide you in organizing your own disaster program—with examples (in italics) from our own experience to show how they work in practice.

STUDY YOUR BUILDING

Your building will be the raw material with which you'll have to work. An overall plan will have to be fitted to such factors as plant location, size and construction of buildings, layout, and type of operations. Above all you must take stock of existing emergency facilities—alarm system, fire fighting equipment, communications, first aid—and then build from these.

The Port Authority Building is a 16-story steel and concrete commercial structure that covers an entire city block in downtown Manhattan. Large enough to house an entire industrial concern on one floor, it contains some 50 tenant companies engaged in manufacturing, warehousing, trucking, and general office work. We are fortunate to have all the latest proved devices that make for safety and efficiency.

BEGIN WITH AN EVACUATION PLAN

You will have to get all personnel, other than those assigned to emergency service, into sheltered areas as quickly as possible. In evacuating a plant of any size, it is important to know your centers of population, so that employees may be removed orderly and efficiently in groups.

More than 7200 people work for the companies in our building. The logical shape for our plan was a floor-by-floor, company-by-company evacuation. (For a single manufacturing plant, it would be department by department.) Since some tenants employ up to 2000 people, we broke them down further into more manageable groups of 50.

CONSIDER THE TIME FACTOR

The time you'll have for evacuation depends on the adequacy of your local civil defense warning system. How long it will be, no one really knows. You just have to approach the problem with the idea of evacuating as quickly as possible, and hope it is quick enough.

Our evacuation plan makes provision for two degrees of warning from Civil Defense. The first, a "yellow" alert, warns of possible attack. Key personnel are warned to complete minor last-minute preparations and stand by. The tenants will not be notified.

Then a "red" warning tells that an actual attack is certain. Instantly 204 fire gongs sound a coded alarm throughout the building, and evacuation begins. Seven minutes after the "red," we plan to have completed evacuation.

PICK SHELTER ZONES

A survey of your plant will point up the locations where people will be best protected from blast, flash, and radiation. If you have a deep, spacious cellar, that's your logical choice. Think twice, though, if it's crowded with high-pressure steam lines. Bursting steam mains can play more havoc than the bomb itself.

If you have no basement, or if it won't accommodate your entire force, then look in the building for suitable shelters. The center of the building or sections of the plant that are heavily reinforced should be considered. Try to get a maximum of steel and concrete between personnel and the bomb. But remember, when choosing a shelter site, that people have to get there fast.

The Port Authority Building has a natural shelter in its basement 20 feet below the street level. Its estimated capacity of 15,000 is more than twice the building population. Twelve freight elevators and three passageways provide direct access to it.

For secondary shelters throughout the building, we chose truck pits—sections at either end of every floor level that are used in unloading vans from our freight elevators. Strongly reinforced to handle large truck loads, these pits are the sturdiest portions of our building proper. Each will hold 500 people.

ASSIGN EVERYONE A SHELTER

In general, assign groups to the shelter nearest their working area. But often (especially with elevator service) a more distant shelter may prove to be nearer in point of time. So keep in mind all available routes of evacuation. And of course people in the more dangerous sections of the plant (on an upper floor or around the outside of the building) must get priority on a shelter over those in more protected areas.

Our basement could easily handle the entire building population, but complete evacuation to this shelter

was not the quickest method. By splitting our people between the basement and the truck pits, we could cut our evacuation time appreciably—and still have everyone in a sheltered position.

We decided to take people from the exposed upper floors (10 and up) down by elevator to the basement. And we assigned people from the safer lower floors (3 through 9) to the truck pit shelters on each level. Workers from the second floor (which has insufficient truck pit capacity for the 2000 occupants) are to be taken to the basement by elevators which would have finished the evacuation of the upper levels. Personnel on the street level floor would move by stairway to the basement shelter.

PLOT EVACUATION ROUTES

The job of moving people out in a fast and orderly way takes planning and coordination. To use all evacuation facilities well, you must set up a definite schedule, and each group must move over a designated route.

We found that plotting it out on paper was the best approach. Floor maps were prepared for each level. These showed the concentrations of people to be moved, and the elevators, stairways, and corridors available for the movement.

For each group of 50, the best route of evacuation was traced out. Then we plotted an auxiliary route for each group as a safety factor. In the end, every person in the building had two designated avenues of escape, with specific elevators, corridors, and stairways assigned to him.

APPOINT WARDENS

Every evacuation group should be in the charge of one person responsible for their successful removal. You'll want an alternate, too, who'll be ready to jump into the warden's role, if necessary.

Our tenants were asked to appoint two responsible men to the posts of warden and auxiliary warden for every 50 of their employees.

In one general meeting we were then able to outline to the wardens the complete evacuation procedure and the role they would be expected to play. Wardens were briefed individually on their assigned shelters and routes to be taken. They were asked to instruct members of their groups.

PUT UP DIRECTION SIGNS

When your evacuation plan is all set, don't keep it a secret. You'll want an extensive system of posted instructions, directional signs, and identifying numbers for all evacuation facilities—shelters, stairways, elevators, corridors, etc. Better have a distinct color combination that identifies any public sign as part of your evacuation plan. To test the effectiveness of your system, just ask yourself: Would a total stranger be able to find his way rapidly through the plant to the nearest shelter?

We used 800 printed placards, 8½ x 12 inches. We put these in washrooms, restrooms, and working areas throughout the building. These posters identify the two different gong sequences that will be sounded for the "red" evacuation signal and for the "all clear." They also tell the people in the area in which the signs are posted their assigned shelter and evacuation routes, and the name of the warden in charge.

Inside the stairwells, directions to the nearest shelter are conspicuously lettered on every landing. Each doorway to stairs and elevators has a number—pasted above it. Every employee has been told what number stairway or elevator he is to use. Throughout the building printed or painted signs point the way to the basement and truck pit shelters. A yellow-on-black color scheme identifies the posters and direction signs to be used in evacuation.

ORGANIZE EMERGENCY SERVICES

Evacuation of personnel is only the first phase of an overall disaster plan. You must also prepare to combat fires, protect utilities, and keep open lines of communication. To keep plant damage to a minimum, you must set up in advance a well-trained and coordinated emergency organization.

Use your full maintenance staff and other key people to maintain order and critical services. Assign every man a specific duty or post. Train him thoroughly in the job he has to do. Centralize the supervision of operations in a control room (located in a sheltered area) which is in communication with all sections of the plant.

All 128 men and 3 women on our building staff are assigned definite roles in our disaster plan. Some of these vital activities include:

1. Control and communications. During the emergency, all lines of communication radiate from our sub-basement control room. When informed of trouble, the control room operator is in a position to direct men and personnel immediately to the scene of action. Pools of auxiliary manpower stand by in the control room and in two dispatchers' offices on the first floor ready to be directed to a danger zone.

Should regular phone service fail, the control room operator still keeps in touch with all sections of the building through our independent intercommunication phone system. Should the power fail, our intercom system will run on auxiliary batteries.

2. Spotters. Men are stationed on every floor to spot fires, broken pipelines, and other damage. Hand phones which they carry can be plugged into watch boxes, fire alarm boxes, or sprinkler boxes to contact the control room operator.

3. Fire fighting. Trained crews stand by to speed to any section of the building. Four special handtrucks—equipped as complete fire fighting stations on wheels can be rushed by elevator to the scene of action on a moment's notice. In addition, fire extinguishers of all sorts are strategically located in many elevators and throughout the building. Our staff knows the location of all this equipment and is trained to get it into action fast. While our water supply stands up, the sprinkler system and our building-wide network of water hydrants will be our first line of fire defense.

4. Utilities. Personnel stand by to cut power lines and close gas, water, and steam mains wherever the damage requires such action. Valves and switches are tagged to prevent a false move. Battery-operated lamps will automatically supply auxiliary lighting for shelters, stairways, and critical areas if the power fails.

5. First aid. On the yellow warning signal, our medical department will begin to evacuate to a sub-basement station, equipped with cots and complete medical facilities. Staff women will be assigned here to assist doctors and nurses. For cases away from the station, every member of our building staff can give first aid.

IDEAS OF THE MONTH for

COLD SPOT in your plant? Wheel in that new portable hot-air furnace. Plug into a 110-volt line. Attach hose to drum of oil. Hang up the thermostat. Turn on the switch—and the blower fan starts. No attendant. No smokestack, because you get perfect combustion, says Quiet Automatic Oil Burner Corp., 33 Bloomfield Ave., Newark 4, N. J.

SLIDE RULE OF THE MONTH. This one comes from The Carpenter Steel Co., Reading, Pa. Push or pull and it will tell you the workability of stainless steels. It'll fit in your inside coat pocket.

PACK 'EM AND STACK. You can buy cartons that stack like paper cups from Shelton Mfg. Co., Inc., 42-24 Orchard St., Long Island City, N. Y. Lip around top of each carton fits indented bottom of box above it. Cost you about 20% more than regular cartons.

FIREYE CORP. has a new system that "sees" and responds instantly to fires. Write to 77 Broadway, Cambridge 42, Mass.

FOR WOOD FOUNDRY PATTERNS there's a coating called CK that withstands heat up to 500 F. The maker (Carboline Co., 7603 Forsyth Blvd., St. Louis 5) says it lasts four times as long as conventional coatings. A 13-lb. kit cost $18, will cover 300 sq. ft. of patterns with three coats.

SHREDDED PLASTIC, says Goodyear Tire & Rubber Co., makes such an efficient filter that it traps and holds the microscopic solids in cigarette smoke. For hot-air furnaces and air-conditioning units.

SAFETY KIT (write to Towmotor Corp., Cleveland 10) contains four bright-colored posters warning truck operators of blind corners, traffic crossings, low headroom, narrow aisles ahead. Especially timely as industry begins to step up the tempo of production.

ITABWODI is what the sign said. We saw it on a desk at Caterpillar. It means: "Is there a better way of doing it?"

SAVE PAINT—as much as 20%, by reducing overspray and atomization losses—with a new spray process that uses superheated steam. Kellogg Div. of American Brake Shoe Co., 230 Park Ave., New York 17.

PAIL FOR PLATING ROOM is molded rubber, has a safety-grip construction at the bottom that gives a firm hold for safe pouring of corrosive chemicals. Graduated markings on the inside. Hanson-VanWinkle-Munning Co., Matawan, N. J.

Factory Executives

ENDLESS HACK SAW can cut through unlimited distance and thickness. (Ordinary hack saws can cut only up to the frame.) Made in England. Retails for $3.95. Zisking Co., Inc., 49 W. 37th St., New York 18.

SAVE THAT TIN by controlling coatings with a new electronic tester. It measures thicknesses as thin as a millionth of an inch in 30 seconds. Sheets that are tested can be used in the end product. North American Philips Co., Inc., 100 E. 42nd St., New York 17.

USING RADIOACTIVE MATERIALS? Then you'll be interested in the Beta-Gamma Hand-and-Foot Checker (The Austin Co., Cleveland).

HYDROJECT is a machine that automatically inspects pencil slats for thickness and moisture content. Slats that are too wet are kicked off. Capacity, 480 slats a minute. To date Hydrojet has been used only in pencil plants. Similar equipment could easily be built for other applications. Got one? Write Engineered Structures, Inc., Tacoma.

TO MAKE YOUR JOINT LEAKPROOF buy a can of Cyl-Seal (West Chester Chemical Co., West Chester, Pa.). Price: $4.50 per gallon. You apply it in liquid form. It changes in the joint to a tough, elastic solid. Isn't affected by oil, gasoline, natural gas, oxygen, steam, etc.

FROM ADOBE BROWN to squash yellow—you'll find all the 775 best-known American color names listed both alphabetically and by hue in Container Corp. of America's new dictionary. The lists help you answer two questions: Given a color name, what colors correspond to that name? Given a surface color, what names can be used to describe it?

PARTY-LINE dictation system consists of one to 20 telephone receivers connected with a central recording instrument. Ask Thomas A. Edison, Inc., (West Orange, N. J.) about TeleVoice.

LAYOUT KIT. To help you make up your mind about three-dimensional planning, you can now get an experimental kit of 200 pieces from Visual Planning Equipment Co., Inc., Oakmont, Pa.

DON'T THROW AWAY those porous castings. They can be reclaimed by the Tincher Process. Tincher Products Co., Sycamore, Ill.

PORTABLE PHOTO-COPIER handles up to 9″ x 14″ legal-size documents—and curved, tightly bound pages, if you like. F. G. Ludwig Associates, Pease Road, Woodridge, Conn.

MORE IDEAS ON PAGE 252

HANDICAPS MEAN LITTLE to the four men standing in this picture. They're all foremen, who have worked their way up through the ranks at Charles D. Briddell, Inc. One has one arm. The other three have one eye each.

An Easy Way to Get Good Results With Handicapped Workers

Here's a case study of a small plant that has done a fine job of employing handicapped workers just by doing "what comes naturally." There's no fuss, trouble, or fanfare about it.

This firm's sensible, matter-of-fact approach is full of hints for any company that is considering hiring handicapped workers. With a manpower shortage on our doorsteps, now's the time to take the hints—and to put them to work.

By M. J. MURPHY
Industrial Relations Editor, Factory

AT CHARLES D. BRIDDELL, INC., Crisfield, Md., every fifth man you see in the plant, on the average, is physically disabled.

In terms of total number of people employed, that doesn't add up to a very impressive figure. It's about 30 men.

What is really important, is the fact that to Briddell the figure isn't "impressive," either. It's just taken for granted.

The company employs about 250 workers, of whom 150 are men. More than half of them are veterans of World War I and II—a fact that has recently earned the company the American Legion national citation for outstanding contribution to the employment of veterans. Of the veterans, 18 are disabled; among the nonveterans, there are about a dozen more disabilities.

To the outsider, the one-to-five ratio of handicapped workers is interesting because it is so much higher than the ratio of handicapped in the general population. That ratio is estimated by competent authorities to be 1 in 50.

BEING A DOUBLE AMPUTEE is no handicap on inspection jobs like this. One of the men in this picture lost both feet during World War II, but finds it doesn't matter when the right kind of job is provided.

"Handicapped" and "disabled" are relative terms

To the many employers who are considering hiring handicapped workers as labor gets scarcer, Briddell's philosophy and operating policies are refreshingly sensible.

The philosophy is simply this: *"handicapped" and "disabled" are relative terms.* If a man can do the job you hire him to do, he's pulling his weight on the team. It doesn't matter then whether he can hear or see or use his arms or legs as well as the next fellow. *For his job, he is not disabled.*

Briddell's operating policies are equally to the point. They are simple and matter-of-fact. To the company, there's no need for elaborate planning or organizing. Hiring disabled workers is just like hiring anyone else. If the man can do the job, that's all that's needed. This attitude makes the approach very informal and fast-moving.

How the Briddell philosophy works out in practice

How well does this philosophy work out in practice? Very well, is the report from all sides. "We find that the handicapped workers are outstandingly interested in their work," says Sales Manager E. L. Riggin, whose interest dates back to the days when he was running the inspection department. "Our turnover is low anyway, but among those fellows it's nil.

"We keep careful production records, so we know what we're talking about when we say that they also turn out a good day's work. We don't have to carry them along. In fact, we sometimes set up their records as examples to others in the plant.

"But don't get us wrong. We don't say that all our disabled employees are supermen, away ahead of everybody else. They're not. But they're *all* doing a *good* job."

Absenteeism is no more of a problem to Briddell than turnover, in general. But there are some exceptions. One man, a double amputee, loses half a day a week pretty regularly for special treatment to relieve irritation in the stumps of his legs. Two men who suffer from recurrent attacks of tropical fever occasionally lose two or three days in a row. Another fever victim, whose case is complicated by stomach trouble, has been out several times for longer periods.

Briddell emphasizes that you have to expect exceptions and be prepared to take them in stride. In practice, they average out, the same as routine illnesses that cause other workers to lose time, says Mrs. Agnes Howard, the company's energetic personnel manager.

"But we are inclined to be more tolerant if the employee is handicapped," Mrs. Howard admits. "To that extent, we depart from our basic idea of treating everybody alike. And I think any company that is interested in doing what we are doing will find that this is a sound idea. Moreover, they will find they don't have to make very many exceptions."

The company is also happy about one other factor that often causes

GOOD RESULTS WITH HANDICAPPED WORKERS ... begins on page 94

employers some worry. Physical adjustment of disabled workers to jobs has caused no problems.

"Our most serious trouble was with a man whose arm had been mangled," Mrs. Howard reports. "And we settled it in five minutes. The arm swelled after he worked at medium grinding for several hours, because he had to exert a little too much pressure with the bad arm in supporting the work. So we just transferred him to light grinding. Then his arm stopped bothering him."

No special jobs, no made work, for handicapped

The key to Briddell's policy is the fact that the company does not try to make work or create special jobs for handicapped workers. Mrs. Howard puts it this way:

"We don't feel that's what they want. Our idea is that we must need them just as much as they need us, if we're to have a healthy business and healthy attitudes inside the plant. For that reason, we don't go out and look for disabled men to hire, either.

"Of course, we work closely with the Veterans' Administration, and we try to cooperate any way we can. In fact, the one time when we made an exception to our rule of not going out after a disabled worker, we got a lot of help from the VA. That was a case where we knew the man very well from years back, though he had never worked for us. We were sure he could do the job we had open. We thought it would do him a world of good. So we offered it to him. He turned it down at first, thinking we were just trying to be charitable. With the VA's help we finally convinced him we were talking a strictly business proposition, and we've had him with us ever since."

Briddell has no policy on the ratio of handicapped workers to the total work force. The reason is simple. There's no need. Job applicants with serious disabilities are in the minority anyway. And, if the standard of ability to do the job is met, they need no other rules.

"To show you how this works out," says Mrs. Howard, "look at the difference between our practices in hiring men and women workers. About 20% of our men have disabilities, but I can't think of any of our women employees who have any that are comparable. Oh, one girl has heart trouble, and a couple of others are diabetics. There are things like that, but they don't fall in the same class with what we call disabilities among our men.

"The reason for the difference is that we have almost no applications from disabled women. Also, there are several firms in this area that employ women workers. So the few disabled ones, mostly polio victims, I'd guess, are spread pretty thinly. On the other hand, we are the single biggest employer of men in the area, and get the largest proportion of applicants of all types."

Though Briddell is matter-of-fact in its attitude toward hiring handicapped workers, it is careful about getting them off to a good start.

"We have to be," is the reason given. "Nobody benefits if the man we hire can't or won't produce."

Every applicant is given a good physical examination by one of the two local doctors the company retains on a part-time basis. The doctor knows the jobs in the plant thoroughly. And with handicapped applicants he is particularly alert to the need to consider how the disability would affect the man's doing his job.

If the doctor's decision is favorable, the personnel manager then discusses the case with the plant manager and the foreman concerned. They interview the applicant, tell him about the job, and size him up generally. If all agree, the man is hired.

The foreman, who has been in on the case from the beginning, can then start on-the-job training with full confidence that he knows the whole story. The company feels this cooperative approach is one of the big reasons why its handicapped workers adjust so well.

There are few hard-and-fast rules about who will or will not be hired. The company does draw the line at hiring applicants with tuberculosis or other serious lung diseases. Also epileptics, who could be badly injured if they collapsed in the shop.

There are no blind employees. But Briddell says there's no rule against hiring the blind. It's just that so far the right applicant and the right job haven't matched up.

There are no restrictions on where disabled applicants come from, either.

"We don't have any problem of 'taking care of our own' here," comments Mrs. Howard. "Most of the disabled men right around here who want to work and can work have jobs with us. So, if we have a job open, we consider any applicant who can do it, regardless of where he comes from. As long as he can get transportation to work and do the job, we can use him."

Handicapped workers can laugh at their disabilities

Like most smaller plants, everybody knows everybody at Briddell. As a result, employee relations are casual and pleasant. And nobody "pussyfoots" about disabilities. They are the subject of kidding like almost any other topic. The company considers this part of a healthy pattern, in a class with the universal plant practice of calling everybody in management, including the president, by their first names.

"We often forget about disabilities, which could be embarrassing, but isn't," says Mrs. Howard. "For example, we recently wanted a group picture of some of our veterans when the American Legion award was being given. I was helping the photographer line the boys up, and told one of them to kneel down in front. 'Don't be silly, Agnes,' he said. 'You know I can't bend this bum leg of mine.' 'Oh, go on back there, Bill,' I told him. 'You're no use to us up here.' By that time the boys were laughing, and kidding both of us. That's typical. Nobody's feelings are hurt."

What kind of safety poster does the best job? Turn to page 204 for a psychologist's analysis of what's effective and what's not.

Announcing the Winners

in FACTORY's $500 Maintenance Idea Contest

FIRST PRIZE—$200

W. McK. Scott, Jr., Plant Engineer, Cold Spring Bleachery, Yardley, Pa.

SECOND PRIZE—$100

Henry M. Bradley, Plant Engineer, Manning, Maxwell & Moore, Inc., Bridgeport, Conn.

HONORABLE MENTION—$25 EACH

A. D. Buschmann, Plant Engineer, Perfection Stove Company, Cleveland

H. G. Diamond, Superintendent of Maintenance, Allis-Chalmers Manufacturing Company, Pittsburgh Works, Pittsburgh

Harry A. Fohl, Manager, Maintenance and Construction, Lukens Steel Company, Coatesville, Pa.

Arthur F. Jones, Chief Electrician, Ware Laboratories, Inc., Miami, Fla.

K. J. Mackenzie, Superintendent of Paper Mills, Eastman Kodak Company, Rochester, N. Y.

George L. Merkel, Plant Engineer, Red River Arsenal, Texarkana, Texas

Thomas M. Shea, Plant Engineer, Sharp & Dohme, Inc., Philadelphia

Edward W. Sutton, Assistant Superintendent, Maintenance and Power, Westvaco Chemical Division, Food Machinery and Chemical Corporation, Carteret, New Jersey.

"MY BEST MAINTENANCE IDEA—HOW I PUT IT TO WORK"

W. McK. SCOTT, JR.

IN 1945 WE HAD STARTED a long-term plant modernization program. It was to include both installation of new equipment and modernizing and relocating much of the existing machinery. The program had been carefully worked out, but, as is often the case, management had ignored plant utilities, particularly our electrical system. This system consisted of ten separate feeders wandering through the plant, every one of them overloaded to the danger point. Previous practice had been to run a new feeder whenever new load was added. Drastic action was indicated.

A thorough study of the problem and of various methods of solving it led to the following plan. We could easily move the substation to a point near the load center. Transformers would be rented from the power company until our load was stabilized. An outdoor housing for a three-unit air circuit breaker would be placed beside the transformers but only two breakers would be installed now. Two busduct feeders would be installed, each supplying one end of the plant. It would be possible to utilize most of the old conduit feeders to tie in the present load. All new work, except reconnecting the motors, could be done without a shutdown.

This system would eliminate our present overload troubles, decrease voltage drop, make it easy to relocate machinery, and immediately provide a distribution capacity sufficient for expansion. The cost, however, was $9400, an unheard-of amount to spend for something that did not actually process a good many yards of cloth per day.

I was able to sell my plan to management by pointing out the following benefits:

1. The modernization program could not continue without increased electrical distribution facilities. My plan, in the long run, was the cheapest way to expand.

2. Relocation of machinery could be accomplished with little expense and almost no loss of production. Layout sketches with my report helped to show this.

3. Blown fuses and other troubles due to overload cost so much in lost production and maintenance labor that, even if the modernization program were stopped, the proposed electric system would pay for itself in less than two years.

The distribution system described above was installed four years ago. In that time our demand has grown from 180 kw. to 480 kw. And the only money we have spent for distribution was the small amount necessary to add 40 feet of duct. No machine has ever been shut down because of overloaded circuits. Our lowest voltage is now 230 volts instead of 190 volts. We never hesitate to move a machine for fear of wiring complications.

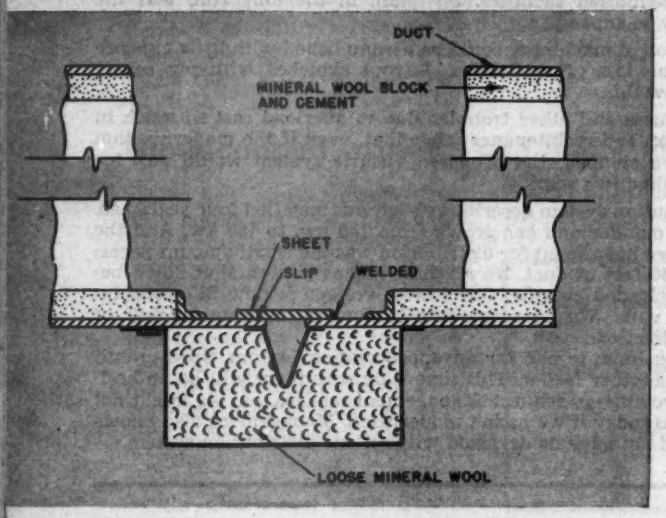
I shall soon have to ask for an appropriation for our third circuit breaker and another feeder. This time I am sure there will be no hesitancy in approving my request. Management realizes that we might not be in business today if we hadn't modernized. Management also knows that we could not have modernized without our distribution system.

OPERATING SHORTS

Fingers Instead of Forks Lift Three Crates at a Time

Lift trucks at A. O. Smith Corporation, Water Heater Division, Kankakee, Ill., now have special attachments to lift as many as three crates at a time without pallets. The attachment, developed by A. O. Smith, has 12 fingers on a horizontal shaft, held in position by light coil springs. A vertical apron below the shaft serves as a rest. When the attachment is pushed up against a crate —or crates—some fingers are pushed back by the slats, some engage the cleats. Here's a typical application: At the end of the production line the truck picks off six crated water heaters, three at a time, and places them on a dolly. Then the truck takes two or three more crates on the fingerlift, hooks onto the dolly, transports the 8 or 9 crates to storage, and stacks them. The benefits of the new attachment are impressive: manpower saving of more than 50%; elimination of all pallets; less damage to crates and contents; and lower lift truck maintenance costs.

SOME FINGERS slide under cleats to lift crate; others are pushed out of the way.



You Can Insulate Duct Expansion Joints

It's easy to insulate expansion joints in ducting. And if you don't, you're wasting heat, according to Public Service Electric and Gas Company of New Jersey. The method Public Service uses is simple: A light-gage metal box is built over the joint all around the duct, as shown. One edge of the box is fastened, one is left unattached, to slip in and out as the joint expands or contracts. The box is filled with loose mineral wool. Depth of box depends on the temperature of the duct. The illustration shows the joint enclosure on a duct that is internally insulated with mineral wool blocks.

Lifting Bar Picks Up 350-Lb. Plates Safely

The safety lifting bar these men are using handles 350-lb. plates at Consolidated Vultee's San Diego factory. It's safer and four times as fast as the old methods—by hand, by car loader, or with a sling attached to an overhead crane. The man on the left, E. L. McCabe, designed the bar. It adjusts to different sizes, has shackles to attach it to overhead crane. Bar clamps to plate, so there's no slipping.

Space Heaters and Insulation Beat Temperatures of 30 Below

At Barre, Vt., where the temperature sometimes gets down to 30 below zero, the Rock of Ages Corporation had a heating problem. They work with wet granite in a large building—15,600 square feet of floor space—with the roof 35 feet up. They never could keep the plant warm until they installed the present system: three space heaters with a total output of 3,750,000 Btu. per hour, fueled with oil. The walls are of corrugated asbestos, insulated with ¾-in. asbestos fiber. Since the new system was installed, absenteeism because of colds has been reduced, according to Robert A. Diak, plant manager.

Source: Dravo Corporation, Pittsburgh, Pa.

Electronic Oven Bakes Cores —But Not the Workers

A new electronic oven in the Huntington, W. Va., plant of American Car & Foundry Company is baking cores at the rate of 600 pounds an hour (3.5% moisture content). Green cores are placed on a moving belt, pass through the oven in about four minutes, on the average. Dielectric heat from high-frequency radio waves is developed only within the cores, so there is little radiated heat to escape into the room. A blower exhausts fumes. Beside better working conditions and time saving, quality of the cores is better. Finish is more uniform and cores can't be overbaked, since power requirement is reduced as the core dries out. Cores come out of the oven at 200 degrees—hot enough to dry the glue but cool enough to handle—and can be used immediately.

Cases in Methods Improvement:

Cut Costs But Not Quality... Simplify Methods... Speed Production

These are the aims of methods engineers at The DeVilbiss Company, Toledo, as their improvement program gathers speed.

Pictured on these pages are typical examples of how DeVilbiss is applying principles of methods improvement to its operations.

Many of its products are made in volume—but a low volume as volumes go in some industries. But even that difficult hurdle hasn't kept company engineers from making real savings in money, time, and effort.

Coating rubber hose with mica mechanically

OLD WAY • Powdered mica, which DeVilbiss finds best for keeping coils of newly made rubber hose from sticking together, was applied to hose by a cyclone duster. The duster often left too much mica on the hose. Inspection and labeling crews had to shake away the excess. And that wasted their productive time. Also, mica seeped and spilled from the machine, drifted through the rubber mill, and damaged machinery.

Storing odd lengths of iron

NEW WAY • This rack was designed to save space in storing odd lengths of angle iron. Notice that shorter lengths go into the near end which opens onto a narrow aisle. Longer pieces go in from the side, which faces a wide main aisle. The rack is 6 feet wide, 20 feet long, and stands 7 feet high. All shelves are coded for quick placement and rapid identification of the angles being stored. Old way was to store angles upright.

The DeVilbiss Company

raises output, cuts maintenance

NEW WAY • A mica-brushing machine has increased worker efficiency and is paying big dividends in mica savings. After getting a final rubber covering, the hose speeds through the brusher to get its mica coat. Little excess mica is left on the hose. And little seeps into the plant. So the plant is much cleaner. Maintenance costs on nearby machinery are considerably less. Gears and motors on those machines last longer.

Cooling slabs of rubber

NEW WAY • Rubber slabs, coming off rolls (background), are cooled in water, then hung on skate-wheeled hangers. Hangers roll to near end of rack, where fans dry rubber so it can be put on pallets.

Assembling atomizer caps

NEW WAY • Direct labor savings from improved method amount to 40%. The job calls for fitting four parts together to form the business end of a perfume atomizer. With this setup, two atomizers can be made at a time. To simplify the old method, parts bins were put close to an air-operated, two-headed impact press. And a tray for finished work was attached to the bench. Twin controls trip the press.

More on next page

CASES IN METHODS IMPROVEMENT . . .

begins on page 100

When Machines Replace Hands, Output's Up Costs Are Down

Egon A. Kunst, assistant to the vice president in charge of manufacturing, showed a FACTORY Field Editor these examples of how DeVilbiss engineers have successfully met the three prime objectives of the DeVilbiss methods program.

Stripping lead from rubber hose

OLD WAY · Before rubber hose can be properly vulcanized, it must be coated with lead. After vulcanizing, the lead must be removed. Lead stripping used to be a real bottleneck at DeVilbiss. Drums of lead-covered hose were hauled to the stripping machine. As hose passed through it, the lead sheath was slit and removed. It fell to a conveyor which took it to a remelt pot. Lead often overflowed. Hose was coiled by hand.

Removing flash from 2000 atomizer bulbs an hour with a buffer

OLD WAY · In the making of atomizer air bulbs, a fringe of rubber remains after the bulb has been pressed. It's necessary to remove this "flash" before the bulbs can be covered with netting and assembled to the atomizer. Here a worker buffs the bulbs by hand with a grinding wheel at the rate of 660 per hour.

NEW WAY · This buffing machine handles more than 2000 bulbs an hour. About 90% of the bulbs made by DeVilbiss can be buffed on it, using only one-third the labor formerly needed. The girl fits bulbs into the indexing table. As the table rotates, the bulbs are buffed and ejected.

by machines cut labor 50%

NEW WAY • Short lengths of the lead sheath ride to the remelt pot on a new inclined belt conveyor. A new vertical belt conveyor carries the bare hose from the stripper to a point above a huge round tub. There it spills the hose into the tub in reasonably neat coils. Direct labor was cut 50%. And the single operator now works with much less fatigue.

Dispensing rubber hose

NEW WAY • To fill an order for hose, the workman cranks this small "ferris wheel," strips hose from the closest reel, meters its length, then cuts it off. New method cuts fatigue and speeds the work.

Assembling vaporizer shells

NEW WAY • Labor cost for assembly of steam vaporizer shells was cut 40% when DeVilbiss engineers simplified the method. Shells are now placed on the table at the right, then reamed with the emery wheel shown. Cones on the bench hold the shells while more parts are added. A rotating table moves the shells to the next operation.

Drilling air caps

NEW WAY • Milling machines are used for precision drilling of air caps. Greater accuracy, better finish, and higher speed are the benefits. Holes are so small a five-power microscope must be used to see them.

NUMBER 7 IN A SERIES: Latest Developments in Electrical Equipment

By GEORGE A. VAN BRUNT • Electrical Editor • FACTORY

TODAY'S ELECTRICAL HEATING EQUIPMENT

Do your heating problems demand ease of control, exactness of results, exact placement of heat where needed, freedom from the danger of combustion? Here's how today's electric heating equipment can solve these problems.

TODAY'S ELECTRIC HEATING EQUIPMENT offers new possibilities of saving you money—because of:

1. Improvements in existing kinds of equipment.
2. Development of new applications and new and better ways of putting such equipment to work.

One of the outstanding features of electric heat is its versatility—the different ways in which you can put it to work.

We have divided electric heating equipment into four main classes: (1) strip and immersion; (2) infra-red; (3) induction and dielectric; and (4) space heaters.

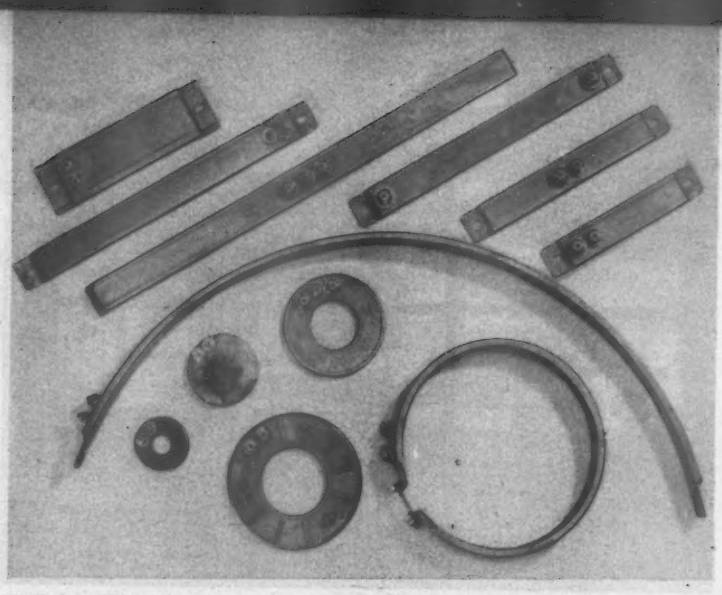
STRIP AND IMMERSION UNITS

These are all based on the principle that if you pass sufficient current through a wire or thin strip of metal, it will get hot. When properly arranged and supported, it can serve as the heating element of an electric oven or furnace.

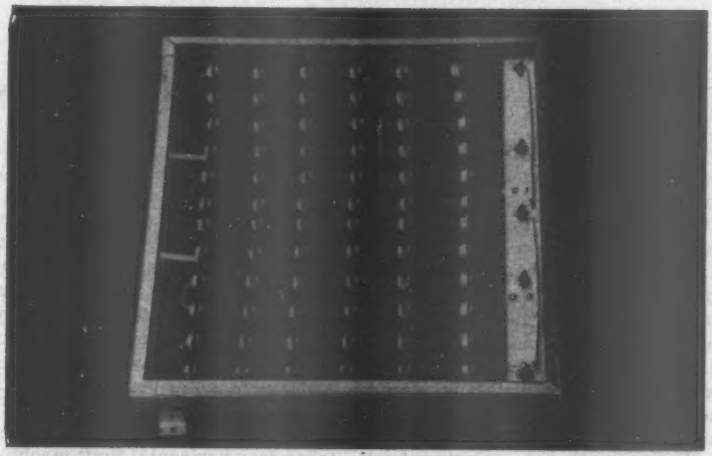
If you put the wire in a tube or some other form of metal sheath filled with magnesium oxide, say, you have a hot stick that can be used in several ways. You can immerse it in liquids and heat them. Wrap it around a pipe; fasten it to a tank, kettle, or almost anything else you want to heat.

Growing industrial application of electric heat is well illustrated by the large increase in the kilowatt rating of the standard heaters of those types used by industrial plants. One prominent manufacturer says that a very few years ago most immersion-type jobs could be handled with heaters rated from 500 watts to 15,000 watts. Today, standard heaters range from 500 watts to 100,000 watts.

There has been a similar change in the units employed in heating air. Not so long ago, heaters with ratings up to 40 kw. were plenty large enough. Now the requirements for heating ovens and for comfort heating in offices and plants call for capacities up to 192



STRIP HEATERS of various shapes and sizes are made to fit the customer's requirements. Curved elements permit good thermal contact.



ELECTRIC OVEN ELEMENT is made from resistance wire, coil wound and hung on porcelain insulators. It is easily repaired by welding when burned out.

IMMERSION UNIT has a threaded plug for tank use.

PORTABLE UNIT permits heating of tank without need for cutting the side.

kw. from a single electric heater.

One company has brought out a narrow-band strip-heater unit that is claimed to give higher heat concentration. A special nonexpanding metal clamping band covers the greater part of the resistance element and provides good contact between the unit and the equipment to be heated. Hence heat conductivity is good; that helps to keep the temperature of the element down.

The idea behind the narrow band is that you will use several instead of one large unit. If one burns out, the loss in heating capacity may not be serious enough to cause a shutdown while the defective unit is being replaced.

There is now available a line of immersion heaters for use in processes where strong sulphuric acid and other highly corrosive liquids are present. They are rated from 200 to 5000 watts, 115 to 550 volts. Sheaths of these units are stainless steel. They can be had in straight lengths up to 176 inches and can be bent to a minimum radius of 1½ inches.

Another line of immersion heaters with pipe-threaded screw plug for mounting in tanks or other vessels can be had with a single- or three-heat switch built into the terminal end. Units can also be had without such a switch, when thermostat control is to be used.

For heating water, the heating units have a copper sheath and bronze screw plug with brazed joints. A steel sheath with forged steel plug and welded joints is supplied when animal or vegetable oils and similar substances are to be heated. Units with alloy sheaths can be had for immersion in solutions that will corrode steel or copper.

The single-heat units have one tubular element. Three-heat units have two elements, which can be connected in parallel or series to give full, one-half, or one-fourth wattage.

There are sixteen sizes of copper-sheathed heaters in this line, ranging from 600 watts to 10 kw.; also, eight standard steel-sheathed heaters in 1- to 6-kw. ratings. Most of these heaters operate on 115 or 230 volts.

From another manufacturer you can get a line of electric water-heater units rated from 600 to 5000

TODAY'S ELECTRIC HEATING EQUIPMENT ...

begins on page 104

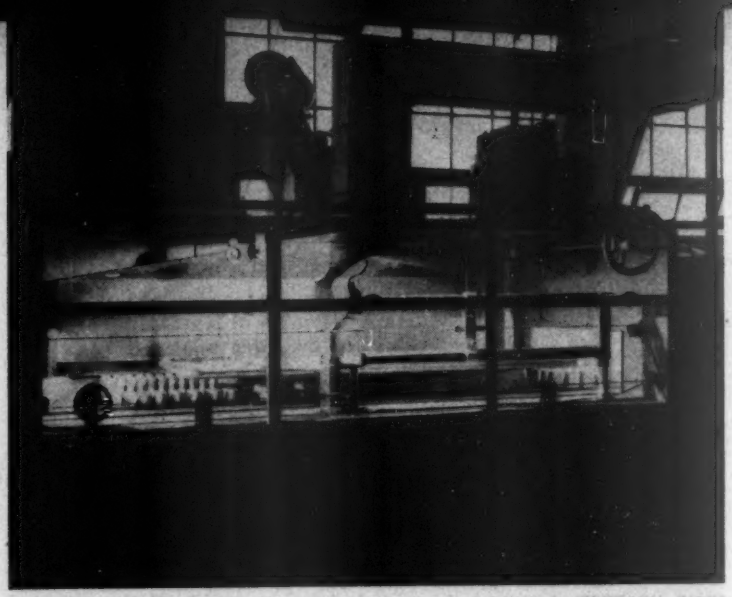
watts. They are made in single, double, and triple loops, according to the wattage required. The sheath is copper. The insulator block is glazed steatite. The flange is forged brass. Voltage ranges are 100, 208, 240 volts.

In case you want to convert small fuel-fired hot water boilers to electric heat, several manufacturers can furnish just what you need. One line of these conversion units, which is generally typical of those available, comprises a copper-sheathed, enclosed-type tubular heater brazed to a red brass plug. The plug has a sealed brass well for the thermostat bulb. The thermostat, which is removable, is mounted on the screw plug. It may be set to control the temperature of the water between 100 and 170 degrees F. Units can be had in four wattage ranges from 750 to 1500 watts, and for operation on 118 to 230 volts.

For portable use, you can get a tank immersion heater rated from 2 to 18 kw. The heating elements are located at the bottom of the vertical riser. They range in length from 12½ to 53 inches in straight sections, or in circular shape for use in round tanks. The heater sections can be obtained with either two or three hairpin elements.

The two-element heaters are designed to give uniform distribution of heat over the entire length of the tank. The three-element units, on the other hand, give a high concentration of heat in confined areas. You can get these heaters with sheaths of copper, steel, nickel-chrome, or stainless steel. They operate on 115 or 550 volts, single or three phase.

Recently made available is an immersion heater for tar, paraffin, oils, and other materials. It comprises hairpin tubular elements welded or silver-soldered into a standard screw plug for mounting in pipe or the walls of tanks. It has a built-in thermostat with a range of 60 to 250 degrees for water solutions, 200 to 550 degrees for oils and viscous materials. The thermostat is adjusted by a knob on its housing. You can get sheaths of copper, brass, or steel.



DIELECTRIC DRYING OVEN, for core drying, shows load passing under the electrodes. Handwheels (upper right, lower left) control spacing of electrodes.

DIELECTRIC AND INDUCTION

There is still another important way in which you can use electricity to produce heat in objects. It involves subjecting them to a high-frequency field. This process takes advantage of two different principles, depending on the kind of material to be heated. For example, if a part made of an electrically conducting material, such as iron or other metal, is placed within a coil that is energized with a high-frequency current, it will become hot in a very short time. Eddy currents induced in the part by the rapidly alternating magnetic flux cause the heating. When the frequency, shape of coil, and all other conditions are right, a part can be brought to a red or even white heat in a few seconds.

This method of heating, known as induction heating, is widely used for heat-treating, annealing, soldering, and brazing all manner of metal parts.

The other method of heating, also involving the use of a high-frequency current, is known as dielectric heating. It is applied to poor conductors or nonconductors, such as rubber, wood, or plastics. The material is placed between two electrodes connected to a high-frequency source. Frequencies used in dielectric heating are much higher than those suitable for induction heating. Stressing of the molecules of the material between the electrodes causes frition, which produces heat. Hence, the material is heated quickly and uniformly all the way through.

A manufacturer of a well-known line of heavy-duty induction heating equipment has recently made some important improvements. These improvements involve principally the design of separate motor-generators and work stations.

The new motor-generators are of the vertical type and occupy only about one-third the floor space taken by a horizontal shaft machine of the same rating. Also, they weigh considerably less, and cost much less per kilowatt.

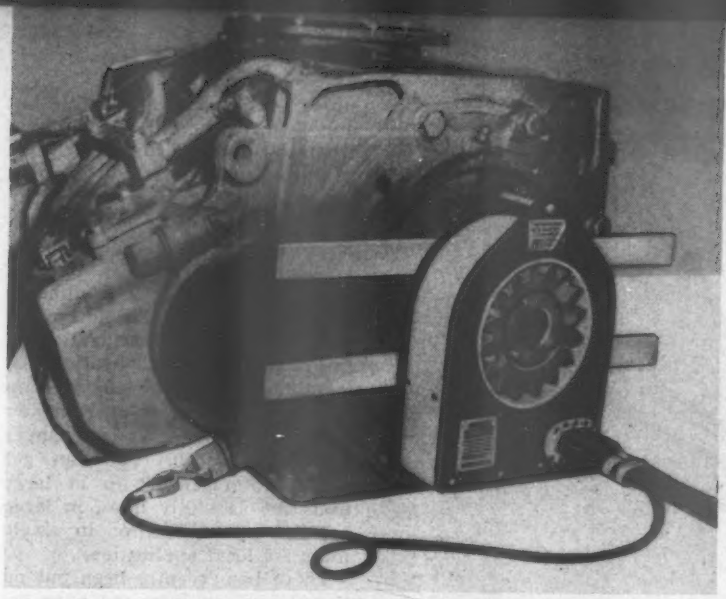
Heating stations are now powered by a separate generator. This makes it possible to locate the generator at some central point, or wherever convenient, and put the heating stations in the most desirable place.

The generator can be controlled from the heating stations.

Separate pipelines are provided for cooling water and quench, so that different sources may be used if desired.

Complete protection is provided from overloads or lack of cooling water. Separate indicating lights give warning when the different protective relays trip.

A bench-mounted high-frequency heater introduced by one manufacturer is said to have an operating cost of about five cents an hour at full load. It is designed to handle



INDUCTION HEATING UNIT makes removal of a motor pinion simple. Quick heating of pinion expands it enough so it slides out easily.

HEATING EQUIPMENT

brazing, soldering, annealing, and heat treating of moderate-sized pieces of any metal. The required temperatures can be reached in from one to five seconds.

If you have to heat steel blanks prior to forging, you can get an induction heater designed for that purpose. It will deliver a blank 2½ x 3 inches, and better than 1 inch thick, heated to 2200 degrees F., about every five seconds. Such fast heating gives little time for scale to form; this reduces down time for cleaning out dies and lengthens their life.

The timing of the heating operation is automatic. Blanks are put into a chute at the far end of the machine and are automatically fed into the heating coil by a hydraulic pusher. As each cold blank is fed in, a hot blank is pushed out at the press end. Heating coils of larger or smaller diameter may be used to accommodate different size blanks. The power source is a 700-kw., 960-cycle motor-generator set.

There is also a portable induction heater now available that can be used for soldering, brazing, and hardening jobs. All controls are arranged in the upper quarter of the control panel, leaving the center clear for work fixtures. Forced air cooling is used. The air is blown through the top cowl, away from the operator. The outfit is equipped with heavy casters. Jack studs at the corners facilitate leveling and prevent accidental movement. It is operated from a 240-volt single-phase line.

Induction heating equipment for the selective hardening of cylindrical parts has recently been made available. It consists of an automatic loading device, a horizontal rotating scanner, and a radio frequency generator. The loader, which comprises a magazine and hopper, feeds the pieces to be hardened to the scanner. Parts are fed at rates up to 6 inches per second, pass through an inductor coil and a spray quench ring. Uniformity of case depth is maintained by close control of the feed. Case concentricity is secured by a guide and rotation of the workpiece about its longitudinal axis. The electronic timing circuit can be adjusted for different hardnesses.

Another company has recently redesigned its induction heater so that each half of the unit is energized independently by its own contactor. Voltage changes are made by a rotary selector switch so arranged that no changes are possible when the heater is carrying a load. You can switch the pyrometer and the program controls to either half of the unit or control both halves as one integrated unit.

One advantage of this new design is that you can use it on two separate jobs within the capacity of each half. For instance, you can use it with manual control of heat on one unit and automatic control on the other for stress relieving. You can also use it for remote control and to follow through any preselected cycle of heating, soaking, or cooling rates.

The heater is mobile and self-contained, with fan-cooled units of 60 and 75 kva. It has a continuous rated capacity of heating 14- to 18-in. pipe welds to 1350 degrees F. for stress relieving. An output of 125% rating can be maintained for two hours with safety. The output side is arranged in two independently adjustable units so that you can make heat adjustments on each side of the weld.

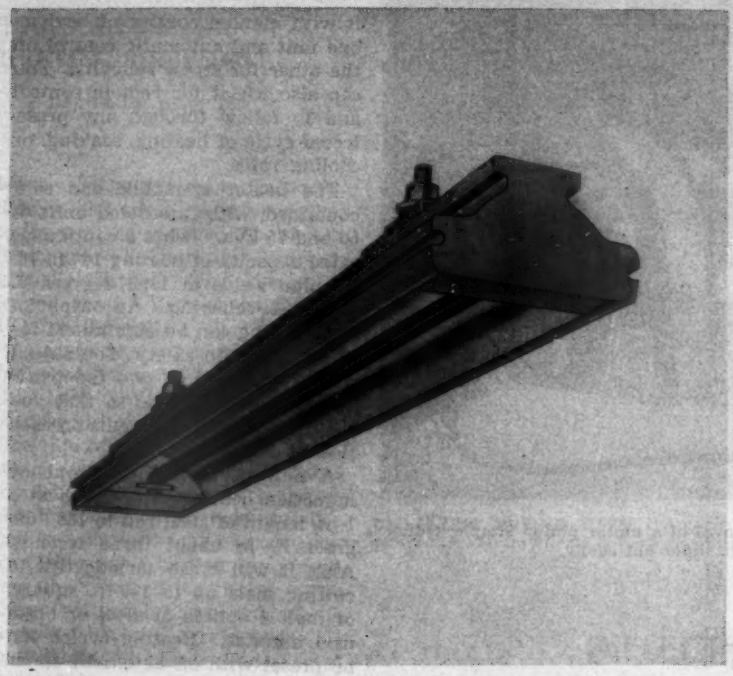
A new portable high-frequency induction heating unit will heat a 1-in. length of steel rod to 1500 degrees F. in about three seconds. Also, it will braze carbide tips to cutting tools up to 1½-in. square, or melt 4 ounces of steel or brass in 4 minutes. Heating cycles can be preset with an automatic timer or you can operate the heater by a pushbutton or foot switch. It gets its power from a 110-volt, 50- or 60-cycle circuit.

If you have trouble in removing motor and other pinions, you can get an induction heater that will make the job easier. The coil is slipped over the pinion and in a few minutes will heat it enough so that it can readily be pressed or pulled off. This heater operates from a 440-volt, 60-cycle source.

If you operate a foundry, you can bake your sand cores with dielectric heat. A large manufacturer of electrical apparatus has developed equipment for this purpose. (See Operating Short on page 99.) In connection with this method, extensive studies also were made of binders and the compounding of various sands.

When using the new binders that have been developed, sand cores can be dried satisfactorily in a few minutes. Among the advantages claimed for dielectric drying of cores are: (1) Ovens need not be kept hot when not in use. They can be put into operation in about 30 seconds. (2) A finer, more uniform finish is obtained on cores than is possible with the conventional method of baking. (3) No power is wasted. When cores are dry, power is not absorbed, since there is no moisture. Hence, there is no over- or under-baking when different sizes of cores are baked at the same time.

More on next page



ELECTRIC RADIANT HEATER for low-heat infra-red applications. These are used where infra-red glass lamps are objectionable for safety reasons.

INFRA-RED EQUIPMENT

You can burn a filament lamp at under-voltage so that it gives a yellowish-red rather than approximately white light, and produces near infra-red rays. Near infra-red rays result when a resistance element is heated to a lower temperature than the filament.

Infra-red rays can be reflected the same as light rays. They pass through air without heating it appreciably. But when they strike a solid surface they are converted into heat and raise its temperature. Hence they are used for a wide variety of heating and drying operations in which this method offers important advantages.

Strictly speaking, there are two general types of this equipment. One generates near infra-red, by the use of a special type of filament lamp. The other type, which generates long-wave-length or far infra-red, is a form of radiant heater in which the element is heated to a glowing temperature.

One manufacturer has developed an all-metal glareless electric radiant heater. It is designed for drying, baking, preheating, and dehydrating processes where a high-intensity long-wave infra-red heat source is desired. The tubular heating elements, which operate at a temperature of 1000 to 1400 degrees F., have a nickel-chrome sheath. It is mounted at the focus of a parabolic reflector of highly polished aluminum. Tongue-and-groove sides and captive sliding bolts facilitate placing the heater section in any working position.

For portable use wherever needed around the shop you can get a new six-light infra-red heating and drying unit which is adjustable in height from 18 inches to 6 feet. These units are mounted on four free-moving casters and may be tilted to any angle, or swung to the vertical or horizontal positions. They are equipped with infra-red reflecting lamps. Two or more units may be combined as a bank.

Now available is an all-purpose drying unit made up of 24 ceramic-type infra-red generators. Each generator is rated 500 watts and is a complete unit with polished aluminum reflector. The panel is said to be unaffected by vibration. The lower part of the panel is 56 inches wide by 73 inches high. The upper part is the same width, but only 29 inches high. It is adjustable from the vertical to nearly horizontal position, operates on 120 volts.

The radiant heating unit introduced by another manufacturer has the element enclosed in an explosion-proof glass tube about 1 inch in diameter. This tube is mounted in a metal reflector designed for close concentration of the heat. Tubes and heating elements can be had in lengths from 12 inches to 47 inches, operating on 110 and 220 volts. Wattage ranges from 240 to 1500. You can get these heaters made up in large units for assembly lines, in large portable assemblies, or in single units for local application.

There has recently been put on the market an infra-red oven especially designed for electric motor repair work. The maker claims you can bake out a fractional horsepower motor in less than 45 minutes, and 1- to 5-hp. armatures or stators in one hour. Besides the off-on switch, the oven has a high-low control and a temperature recorder so that you can keep close track of the temperature.

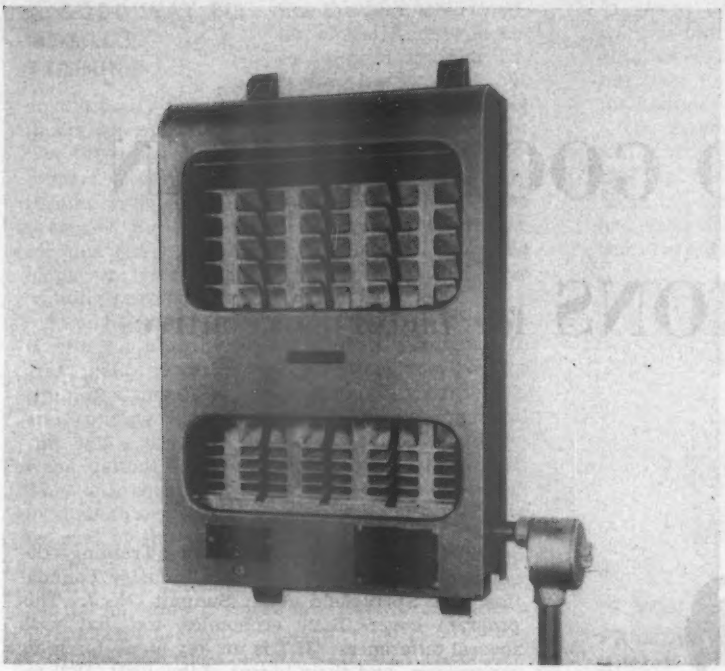
What is called a radiant-heat torch has been developed by one company. It consists of the heating element embedded in a ceramic material and encased in a steel housing with radiating cooling fins. You hold it with a pistol-grip wooden handle and point it at the place you want the rays to strike. It is said to give all the heat necessary for ordinary flame torch purposes. That is, it will burn off paint or enamel, anneal light metals, melt cable insulation, and dry out wet equipment. The torch weighs 2 pounds. It has a replaceable element and operates on 115 volts.

Glass plays a major role in two other long-wave infra-red heaters. One consists of glass plates to which a metal compound is applied in continuous strips. A thermostat maintains the desired temperature.

Plates are available in a number of sizes. Others can be had on special order. A wide range of voltage and wattage ratings also is available.

In the other units, the resistance wire is closely woven in glass fiber. The panels may be operated horizontally or vertically, to heat the work from both sides. They may be curved to meet specific needs.

Special units for operation above 700 degrees F. can be had on order.



EXPLOSION-PROOF SPACE HEATER for class 1, group D locations. Cast aluminum grids remain at low temperature but retain high conductivity.

SPACE HEATING EQUIPMENT

Now available are two new models of a compact, lightweight electric heater that will find use in supplemental heating applications where electric power is the most convenient heating medium. These units may be operated as a heater or cooling fan or as a continuous air circulator with intermittent heating controlled by a thermostat. One unit, an overhead type, is 2 feet square and weighs 70 pounds. An adjustable blower can be set in 22½-degrees steps to discharge at floor, wall, or ceiling. The other unit weighs 115 pounds, stands 34 inches high on 9-in. legs and can be either floor mounted or suspended overhead.

These heaters operate on 220 volts, use 13,100 watts in developing about 45,000 Btu. The blower moves 260 cubic feet of air at a speed of 1300 feet per minute.

If you want a different type of heater, you can get a pressed steel radiator unit which may be used for central heating to supplement the present heating system or to supply temporary heat. This unit is electrically heated through the medium of hermetically sealed oil and is thermostatically controlled. It is filled with a low expansion oil that is permanently sealed in and once installed is said to require no maintenance and no change in oil.

An electrical element welded into the radiator or panel wall-type pressed steel unit heats the oil, providing a low surface temperature of 160 degrees F. The heat is dissipated over a radiating surface of 20.15 square feet per kilowatt. These units are available in 12 models of various types and designs in wall units as well as floor-type radiators.

Also, you can get an electric steam radiator that is thermostatically controlled and shuts off automatically when the preset temperature is reached. This unit heats by radiation and convection and holds heat for some time after it has been shut off. Made of rust-resistant cast iron, it is said to be safe for use anywhere because it does not absorb oxygen from the air and has no exposed wires. It is available in portable and stationary models in six sizes, operating at 110 or 220 volts.

There is also on the market an explosion-proof electric heater that is designed for use in atmospheres containing flammable liquids, solvent vapors, or natural gas. The heating element consists of a nickel-chromium resistor wire insulated and sheathed in a seamless metal tubing embedded in a one-piece finned aluminum casting. The cast aluminum safety grid is said to remain at a low operating temperature, but to retain high thermal conductivity. This unit may be thermostatically controlled through a contactor. It's available in three models with ratings of 2000, 4000 and 6000 watts.

There is also available another explosion-proof electric radiator that was developed for use where explosive atmospheres are a hazard. All switches and connections are sealed in heavy cast-iron housings strong enough to contain a flash, if by chance explosive gases penetrate. Automatic controls prevent internal pressures building up above 30 psi.

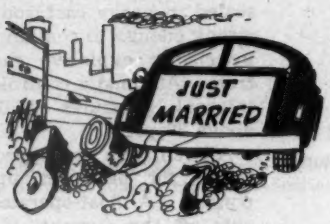
All radiators are hydrostatically tested for pressures up to 140 pounds. A float-operated switch cuts off the current if through neglect the water level should drop below the level of the float. This is positive protection for the immersion-type heating element, which must always be fully submerged.

To keep your feet warm on a cold or damp floor, one manufacturer has brought out a rubber mat that is electrically heated. It is said to give off enough heat for comfort up to the knees. This mat is reversible and has deep ribs on both sides, to prevent slipping. It resists abrasives. Dimensions are 14x22 inches, but it is only 5/32 of an inch thick. You can plug it into any 120-volt line.

Should you have need for a portable electric unit heater, one manufacturer has developed a unit that circulates warm air at the rate of more than 200 cubic feet per minute. It has a motor-driven fan, and the entire front and back areas are wide open, unobstructed grilles. During the summer you can use the unit for cooling.

The 1320-watt, 115-volt, a.c. model is compact, stands on a tip-proof base, and has either a carrying handle or a wall mounting bracket. Other models for 2000 watts, 230 volts, a.c., are available with or without built-in thermostat. These are suitable for heating larger rooms or for use where the temperature must be controlled.

TIPS TO GOOD HUMAN RELATIONS for factory executives



MARRIAGE LEAVE WITH PAY Add another fringe item to the long list of "with pay" benefits employees get. This one is a week's leave of absence with pay for employees who get married. The new policy has been set up by Pitney-Bowes, Inc., Stamford, Conn. Here is how it reads:

"One week's absence with pay will be allowed an employee who requests time off to be married. Additional time off will be granted if desired, but will be considered a leave of absence without pay unless taken as vacation due."

ECONOMIC FACTS OF LIFE—IN NEW FORMS "VEP" and "JET" sound like two new additions to the long list of government alphabetical agencies. But they're not. They stand for two new ways of spreading basic economic information in industry.

VEP is short for *Visual Economics Program* on "How Our Business System Operates"—developed by the National Association of Manufacturers. The program is designed to be presented to rank-and-file employees by a company representative who has been trained to do the job. There are three one and one-half hour sessions, in each of which visual displays on flannel boards play an important role. Groups are small—not more than twenty. Content is factual, unacademic. There is room in the third session for the company's own story. James E. Barron is NAM's director of VEP. For information about VEP, write to him at 444 Madison Ave., New York 22.

JET is short for Job Economics Training—developed by the Training Within Industry Foundation, 281 Springfield Ave., Summit, N. J. This program covers basic economics, too, but with several differences: JET is for key men—foremen, supervisors, and their bosses. Like VEP, JET relies on trained company representatives, though you can get TWI-trained outside men to help if you're small. Basic idea is that key men will pass on what they learn in JET sessions in daily contacts with workers in plants. Tryouts to date have been very successful.

MOST JOB-SEEKERS TELL THE TRUTH That most job-seekers have well-polished halos may surprise some skeptics. But the fact is that you generally can count on a truthful answer from the average applicant when you ask him what his former job was and how much he earned on it.

Here are some examples of the kind of results you can expect if you check job-seekers' statements back against the records of their former employers.

The conclusions are drawn from *Minnesota Manpower Mobilities*, Bulletin 10, issued by the Industrial Relations Center, University of Minnesota, Minneapolis.

Wages. ". . . Employees' reports of hourly wage rates, both at the beginning and ending of a job, had a high degree of validity." (Correlations of .85 to .97).

Reported job assignments. "For jobs held in the most recent year, employee and employer reports were consistent in more than 90% of all cases."

A GOOD WAY TO MOBILIZE TRAINING

The Northern Ohio Chapter of the American Association of Training Directors has worked out an unusually promising plan to mobilize training in the defense program. Lack of training in times like these is bad for workers and worse for employers, the association reasons. And it's especially serious in smaller plants that have no organized programs. So it has set up an advisory committee for emergency training that meets with interested employers weekly and helps them set up new training programs or improve old ones.

In addition, starting February 19, the committee is offering a three-week "institute" designed to give plant operating executives responsible for training a sound briefing in methods of setting up and running their own programs. Sessions will run half a day, five days a week, for the three-week period. The best training men in northern Ohio will cover the topics they are most expert in. Laboratory sessions and plant tours will also be part of the program.

This is a good approach for any part of the country. It's intended for Ohioans, but you can get the full story if you're interested from William Donaldson, Cleveland Chamber of Commerce, Cleveland, O.

HOW TO WRECK YOUR WAGE STRUCTURE

When labor gets scarce, there's a big temptation to ignore the rates spelled out in labor contracts and buy new help at premium rates. If you're tempted to do this, warns the Associated Industries of Cleveland, watch out. It's the surest way to wreck your wage structure.

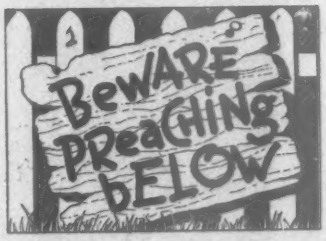
Present employees resent bitterly seeing brand-new workers paid more than they are getting. And unions take such actions as the go-ahead to refuse to take contract rates seriously.

The best approach, advises the Associated Industries, is this: "Before exceeding contract rates in hiring new employees, it is better to formulate a system of performance review, set up rate ranges or expand existing ones, but make completely certain that only workers who deserve pay boosts on the basis of performance get them."

CHRISTMAS GIFTS THAT COUNT

Here's something to keep in mind for next Christmas. It was done by a large and newly arrived employer in the Indianapolis area. Seeing that employees had put up Christmas trees in every department, the company suggested that those who were interested might want to put some gifts on the trees. Two kinds of gifts were suggested: toys for children in local hospitals for crippled children, and adult items for bedridden soldiers in local veterans' hospitals.

The response within the plant was immediate and gratifying. Employees welcomed the idea, and their enthusiasm spread to the community as well. More important, however, many crippled children and veterans ended up with a happier Christmas than they would otherwise have had.



IF YOU WANT TO PREACH, DO IT RIGHT

The little sign reproduced above is one way to do it right, if you feel you *must* do some preaching in your employee magazine. It's a refreshing recognition of the kind of suspicion that often crops up in employees' minds when anyone in management starts to preach.

The idea is used by General Manager M. Rosenthal of Maiden Form Brassiere Company, Inc., Bayonne, N. J. Committed to the concept that the employee magazine belonged strictly to employees, Rosenthal long refused to address any messages to employees through its pages.

Then, about a year ago, he decided to run an occasional message, but with ample warning about its purpose. Employees greeted the idea gleefully, responded so well that the "Beware" column has now become a regular feature.

HOW TO MAKE YOUR P.A. SYSTEM PAY DIVIDENDS

Getting extra benefits out of your public address system is easy if you follow the example of the San Diego plant of Consolidated Vultee Aircraft Corporation. Once a week, during the day's first 10-minute rest period, a reporter from the company's newsroom broadcasts company news. Items covered include facts about new orders, cancellations, new training courses, and the like. All news relates to worker and job.

In addition, the division manager talks to employees on alternate weeks, in a "voice of management" program. No special subjects. He says what's on his mind at the time.

This is one of the many examples of ways to improve employee communications that you will find in the new *Casebook of Employee Communications Programs*. It's the work of the Industrial Relations Division of the National Association of Manufacturers. It contains literally hundreds of case examples that are worth studying.

1 HOST GREETS GUEST

Host Zimmer: "Come in, neighbor. I'm so glad you finally made the long trip across town to see us."
Guest Gould: "I'd have been over sooner, but they keep me pretty busy making pumps. What's this story I hear about the big increases in productivity you've made here in your television tube plant?"
Host Zimmer: "I'll be glad to show you everything we've got."

Guest Norman J. Gould is president of Goulds Pumps, Inc., located on the other side of Seneca Falls, N. Y. His host is H. Ward Zimmer, who is executive vice president of Sylvania Electric Company.

CAMERA TOUR: SYLVANIA ELECTRIC PRODUCTS INC. SENECA FALLS, N. Y.

PHOTOGRAPHS BY DICK WOLTERS

How Better Methods Can Bring Greater Output per Man-Hour

WHEN A PUMP MAKER takes time out to visit a television tube plant, you can bet your bottom dollar he's not trying to learn how to make tubes.

Then what *can* he hope to learn there?

Well, this pump manufacturer has heard a lot about how the television tube plant has increased productivity. And that's something he wants to know more about. That's *his* problem, too. It's the thing that's most on his mind—because he knows his big job in this national emergency is to make more pumps. And he knows he'll have to turn them out with the same number of people—perhaps with even fewer people.

The pump manufacturer is Norman J. Gould, president of Goulds Pumps, Inc., in Seneca Falls, N. Y.

The plant he's visiting is Sylvania Electric's television tube plant, also in Seneca Falls.

His host is H. Ward Zimmer, Sylvania's executive vice president. He's your host, too, if you care to hitch a ride while he and Guest Gould tour the plant. You, too, will find here inspiration and ideas that will help you win the battle for greater output per man-hour in your own plant.

2 SEALING GLASS FACE PLATE TO METAL CONE

Host Zimmer: "Here, as in many of our operations, you see the old and new methods side by side. That's because the demand for tubes is so great we have to keep right on using the old."
Guest Gould: "I can see this (above) is the old."

Host Zimmer: "Yes, and here (above) is the new way we do it. This 10-head rotary machine seals five times as many face plates per hour as the old single-head machine. Anneals them, too. That eliminates a separate annealing operation and another handling."

3 SEALING GLASS NECK TO METAL CONE

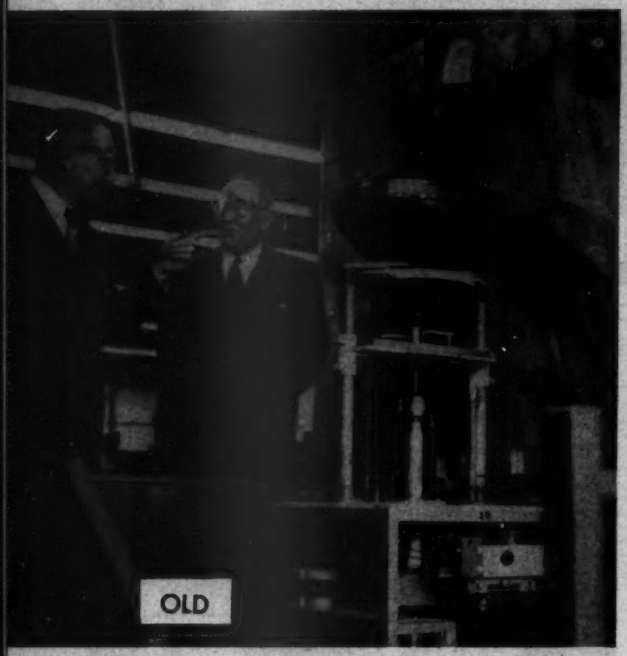
Host Zimmer: "Here's the old way. The glass lathe holds the cone and the neck while the gas flames preheat, seal, and anneal."
Guest Gould: "But I see one operator can run two of these lathes. That must double his output."

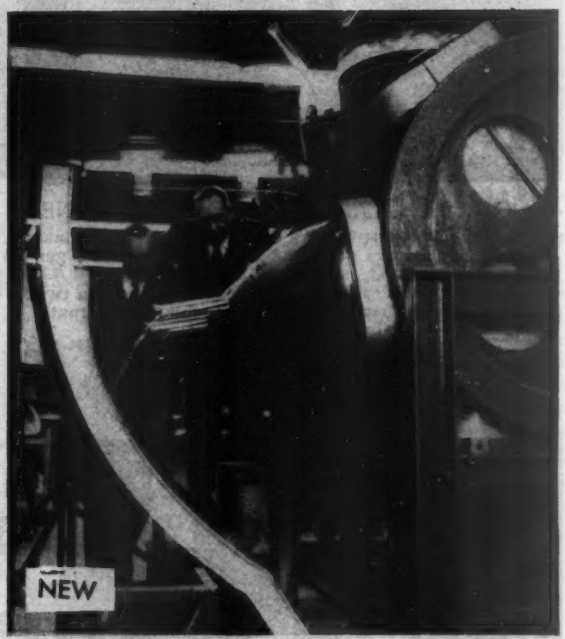
Host Zimmer: "Just about. But compare that old method with this new one (above). All the operator has to do here is load and unload this automatic indexing machine. It will turn out 4½ times as many pieces per hour as the two glass lathes you saw across the way."

4 WASHING AND RINSING TELEVISION BULBS

Guest Gould stops for a close-up peek at the old washing method. First the operator washes the inside of a bulb with a hydrofluoric acid solution. Then he follows up with a clear water rinse.
Host Zimmer: "The idea here is much the same as in sealing. Again it's a case of replacing the manual method with an automatic indexing machine, which takes the bulb through a number of washing and rinsing stations. One man with this machine can wash twice as many bulbs—and at the same time wash them better."

More on next page





5 COATING THE INSIDE FACE OF THE BULB

The purpose of this operation is to provide the fluorescent screen on which the picture is produced. The old method is shown in the left-hand photographs.

Host Zimmer: "This dispenser measures out just the right amount of solution. A second operator loads four bulbs on a cart which is pushed to a storage area for a specified settling period. After that, the bulbs are moved to a pouring station (below, left) and loaded into a chuck on a pouring table. The solution is then automatically decanted at just the right speed to leave the screen intact."

Host Zimmer: "Now all the filling, settling, and decanting I just showed you is done on this continuously moving belt (top, right). The operator at this end unloads a screened bulb and fastens a new one in a chuck. The solution is poured in. The screen material settles as the bulb moves along the belt. And the solution is automatically decanted (below, right) as the bulb goes around the turn. Screen is left intact."

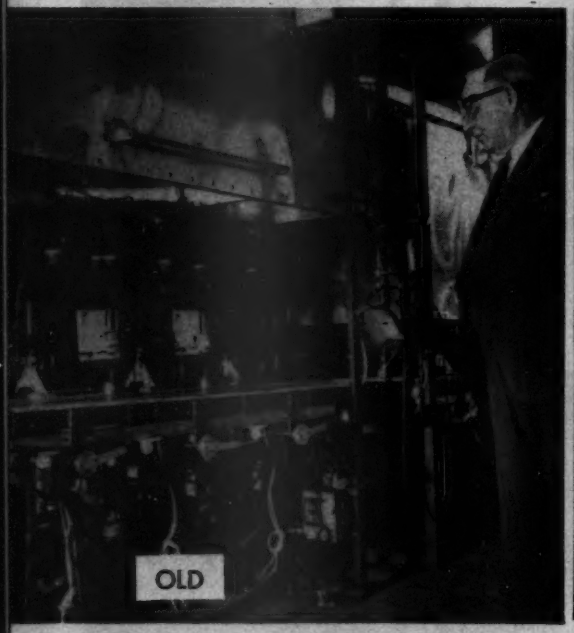
Guest Gould: "Doubles your production per man-hour?"

Host Zimmer: "Yes. But the really big benefit is better quality. It's important not to jar the bulb—and there's not even a jiggle on the machine."

6 A MILE AND A HALF OF TROLLEY CONVEYOR

Guest Gould: "So you've been holding out on me."
Host Zimmer: "What do you mean—holding out?"
Guest Gould: "Why, you haven't said a word about this really wonderful handling system. Yet I doubt if these new methods would have paid off if you hadn't devised some way to keep tubes moving."

Host Zimmer: "You're right. As tubes got bigger and bigger handling became more of a problem. We were finally handling these big tubes on 4-wheeled floor trucks. And it took about 300 of them to do the job. We were always in a jam. Now it's different. We're using air rights and saving valuable floor space."



7 EVACUATING AIR AND GASES FROM TUBES

Guest Gould examines old type of exhaust equipment. Upper part is electronically heated oven that is lowered over tubes. One operator can tend a group of six of these "trolley" exhausts. But controls are manual, so it's "up to the operator."

Host Zimmer: "The rotary exhaust machine is completely automatic. We've a dozen. This one is our biggest—a 24-head machine measuring 27 feet in diameter. The automatic machines will turn out five to ten times the production of a group of six trolley exhausts."

8 PACKING AND SHIPPING TELEVISION TUBES

Host Zimmer: "We had this act staged so you might see the difference between our old and new shipping methods. The old way, over there at the left, was to pack each tube in a separate carton, load 30 cartons on a pallet, move the pallet to the shipping platform, then carry the cartons into the truck, just as those five men are doing."

Guest Gould: "Not too inefficient, either."

Host Zimmer: "Much too much manual handling, though. Just compare the old way with the new way and you'll see exactly what I mean. The new way is to pack 12 tubes in a large carton. Two big cartons are strapped together to make a unit load. The fork truck picks up the load in the packing room and carries it directly into the waiting truck. We eliminate the handling of those 24 individual boxes."

Guest Gould: "It's certainly a good example to wind up this tour with. Thanks for a most instructive morning. I've seen enough to strengthen my conviction that there is nothing quite like better methods and better materials handling when you have to increase output per man-hour—and that is plainly our one biggest job today."

► How often should you paint? What colors should you use?

► Should you do your own painting or call in a contractor?

Here's a chance to check your painting practices with . . .

Painting Practices in 228 Plants

Late in 1950, FACTORY, in cooperation with the National Paint, Varnish & Lacquer Association, conducted a survey of painting practices in 228 plants. Among industries covered were metal-working, rubber and glass products, plastics, drug and chemical, food, lumber, and textile. Size of plants ranged from 20 to 22,000 employees.

Here are the questions we asked and the answers we got:

HOW OFTEN DO YOU PAINT YOUR STRUCTURE?

Exterior interval	
1 year	3.6%
2 years	8.9
3 years	34.9
4 years	16.8
5 years	22.3
Over 5 years	13.9

Interior interval	
1 year	6.7%
2 years	14.8
3 years	22.2
4 years	12.6
5 years	14.9
Over 5 years	18.8

Appearance, cleanliness, and aid to lighting were the main reasons given for present interior painting practices. For exteriors, corrosion topped the list, with appearance a close second.

Have you set up a plan for painting structures at specific times?

Yes	30.3%
No	69.7

Do you live up to it regardless of business conditions at the time?

Yes	50.0%
No	50.0%

WHAT COLOR?

Interior color preference	
White	46.6%
Color	53.4

In a similar survey made in 1945, 57.5% of the respondents preferred white; 42% color.

WHY?

Reason for color choice	
Eye comfort	22.1%
Appearance	19.8
Morale	8.6
Safety	6.6
Cleanliness	6.6
Illumination	3.0
Durability	1.3
Contrast	.9
Harmony	.9

WHEN DO YOU PAINT MACHINERY?

Interval	
Continuously	7.1%
1 year	30.0
2 years	18.0
3 years	11.0
4 years	7.5
5 years	11.0
Never paint	15.4

WHAT COLOR IS USED?

Gray	56.8%
Green	43.7

In the 1945 survey, 64.3% of the respondents preferred gray; 35.7%, green.

Among other colors listed were yellow, red, maroon, and orange. Most plants listing these colors said they were used for safety purposes.

WHAT PERCENTAGE OF YOUR PAINTING IS DONE BY YOUR EMPLOYEES?

No. Companies	Employees Do:	No. Companies	Employees Do:
67	100.0%	6	40.0%
12	95.0	2	35.0
23	90.0	7	30.0
13	85.0	16	25.0
12	80.0	14	20.0
16	75.0	2	15.0
2	70.0	11	10.0
1	65.0	4	5.0
5	60.0	13	—
18	50.0		

HOW DO YOU APPLY PAINT?

By brush	73.0%
By spray gun	40.4
By roller	0.8

The figures add up to more than 100% because some plants use more than one method.

HOW MANY COATS?

One coat	61.9%
Two coats	38.1

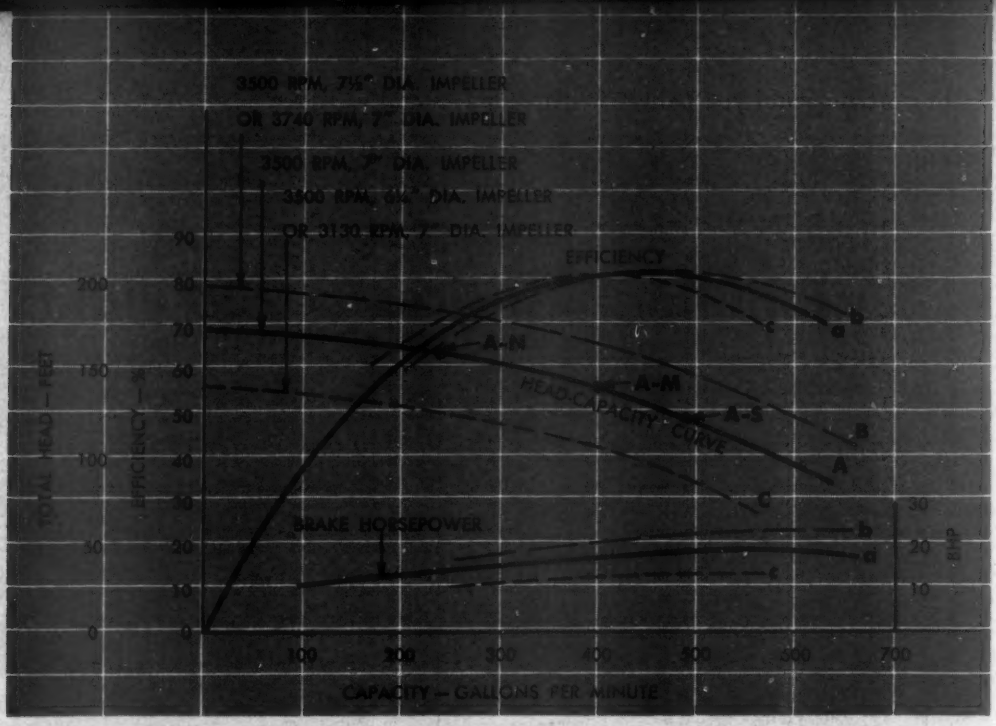


FIGURE 1 TYPICAL CHARACTERISTIC CURVES FOR A CENTRIFUGAL PUMP

With System-Head Curves You Can

Want to make your centrifugal pumps last longer?

Want to save on power bills?

Want to get more gallons per minute per dollar invested?

All these benefits can be yours if you use system-head curves to guide your choice of equipment.

By THOMAS F. KEATING • Test Engineer
De Laval Steam Turbine Company
Trenton, N. J.

IF YOU USE one or more centrifugal pumps in your plant, a system-head curve will save you money.

You will save by buying the right size pumping equipment for the job. You will save in power bills. You will get more gallons per minute per investment dollar. Your equipment will last longer.

These are broad claims. But I promise you this article will prove one overall fact: Anybody who installs new or extra centrifugal pumping equipment without using system-head curves faces a 10 to 1 chance of missing out on at least some, if not all, of these benefits.

On the credit side, a system-head curve will simplify the problem of pump selection and operation. It's invaluable where layouts are complicated. It will avoid costly mistakes. And it will tell you exactly what performance you can expect under various load conditions.

The Basic Problem • A centrifugal pump has definite operating characteristics. To sum them up: *Running at any given speed, a centrifugal pump operates at maximum efficiency at one capacity only.*

Figure 1 above illustrates this point. It's a typical graph of pump characteristics. It shows by the solid lines how total head (static head plus friction head), efficiency, and brake horsepower (bhp.) of a 3-in. pump, running at 3500 rpm., vary with capacity. This pump is designed to deliver 450 gpm. at 130 feet total head. At that point it requires 18.0 bhp. And it operates at the highest point of its efficiency, 82%. If you increased the total head you'd cut down on pump capacity and efficiency. Or if you decreased total head, thereby increasing capacity, you'd get less efficiency.

These pump characteristic curves show how important it is to buy the right pump and driving equipment. This means you ought to know what you expect the pump to do. That's where the system-head curve fits in.

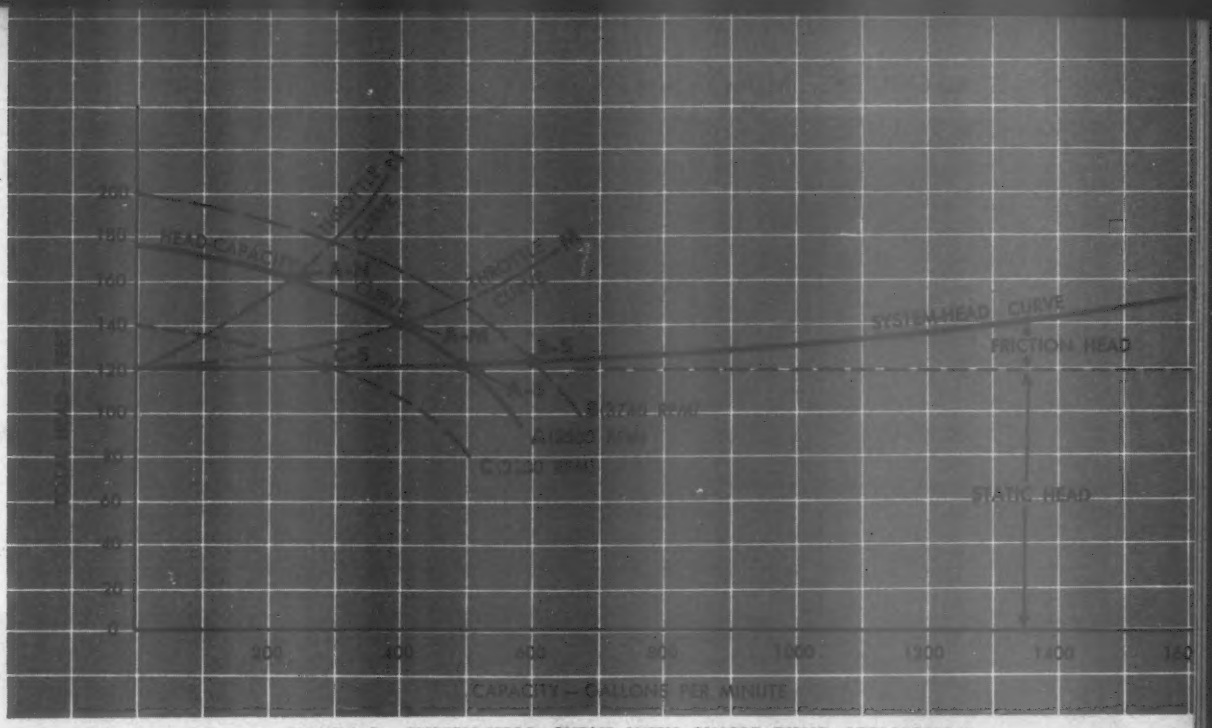


FIGURE 2 SYSTEM-HEAD CURVE WITH SINGLE PUMP APPLICATION

Pick Your Pump to Fit the Load

How to Plot the System-Head Curve

Object of a system-head curve is to make sure your pumping equipment matches the load and is giving you the capacity you want at the highest possible efficiency.

Here's what it looks like. Take the same chart used in Figure 1. Use the same graphic units, i.e., head in feet and capacity in gpm. Then plot the head-capacity characteristics of the *piping* system. You will get something like curve S in Figure 2 (top of page). In simple language, this curve shows the pressure required to push any given quantity of fluid through the piping layout.

How is the curve developed? Let's take an easy example, that of a pump sucking water from a well and delivering it to a higher elevation. You can get your static suction and discharge heads (in feet) by actual linear measurement. You will need to make a piping diagram, showing pipe lengths, diameters, elevations, fittings (elbows, valves, etc.), and type of pipe.

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After computing pipe friction losses, you compute the losses through all fittings, including those at the extreme entrance and discharge of the piping system. Here you can choose either to apply formulas, or to use the Hydraulic Institute tables.

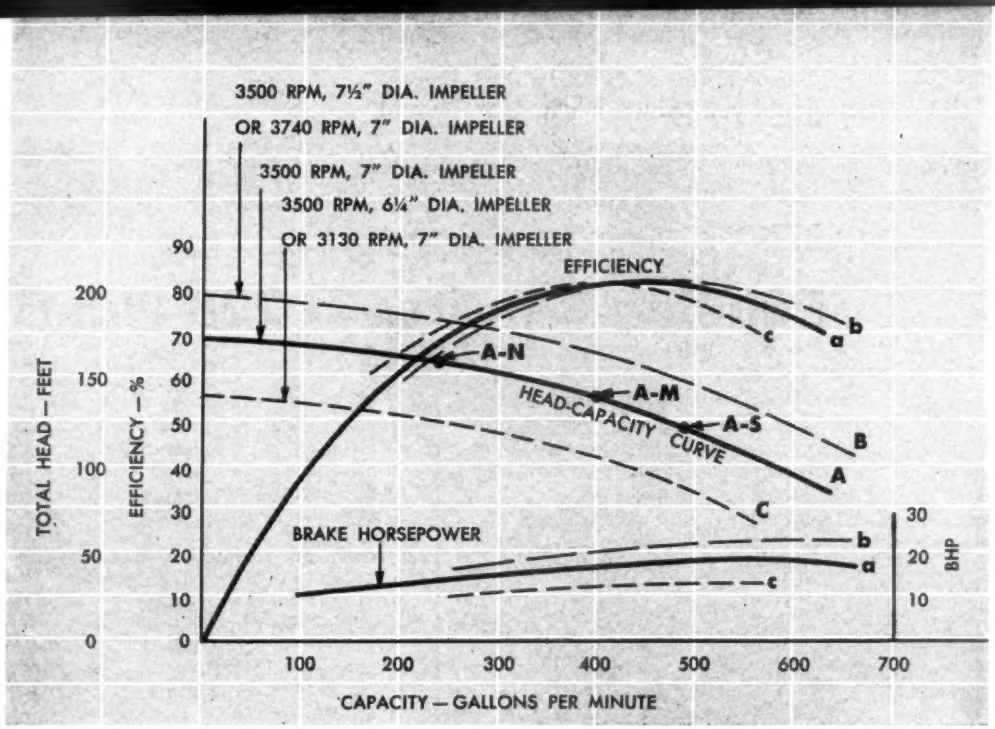
Now you have everything you need. By adding the variable friction head to the constant static head for various capacities, you come up with the system-head curve S in Figure 2.

All installations are not quite that simple to figure. Often the static head varies because of changing levels in a well, tank, or reservoir. Then it's best to draw three separate system-head curves corresponding to minimum, maximum, and normal water levels.

Sometimes you have two or more pipelines leading out from one pumping station. If so, you must plot combined system-head curves for the various combinations of lines in parallel through which each pump discharges. These are obtained from the individual pipeline curves by summing up the individual system-head capacities of each pipeline for each head.

Frequently an industrial system has a water tower "floating" on the system, with control devices for intermittent pumping. Purpose is to boost water pressure or to serve as a reservoir. When applied to system-head curves, these towers boost static head.

There are other types of piping systems more complex than these. One example is a piping network or cross-hatching layout for drawing off water at different points in varying quantities. Because of the many possible combinations of demand, it is usually impracticable to represent these complex systems by a basic system-head curve. *More on next page*



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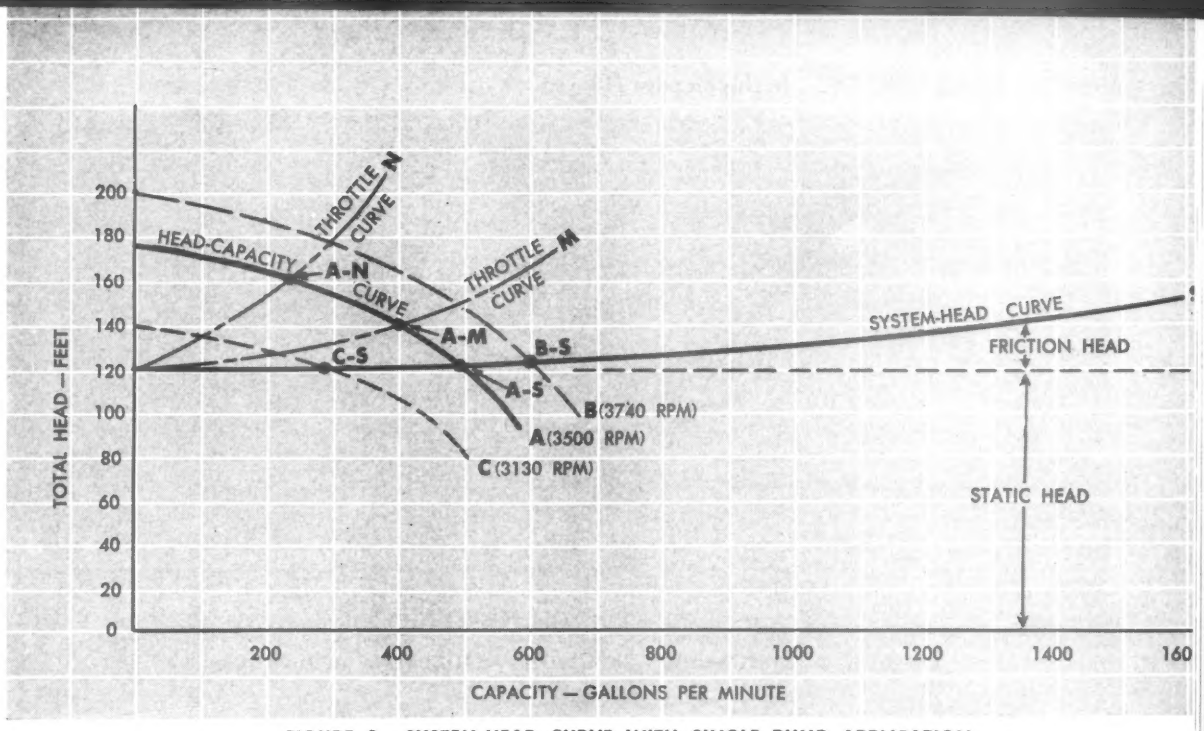

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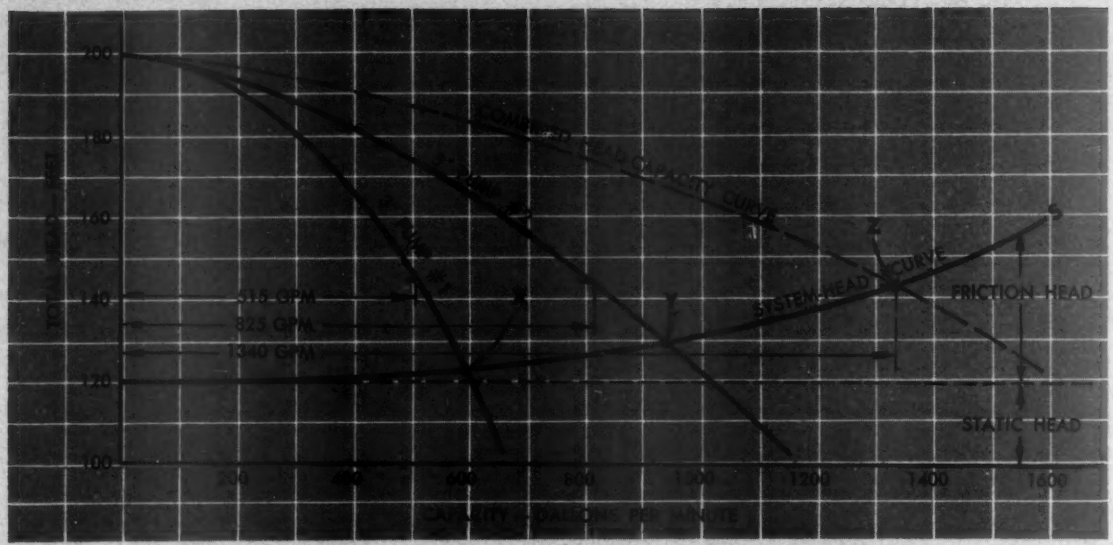

FIGURE 3 SYSTEM-HEAD CURVE WITH PARALLEL PUMP APPLICATION

How to Use the System-Head Curve

After you develop your system-head curve, you plot on the same graph the pump head-capacity curve A (from Figure 1) as shown in Figure 2. The point where the two curves A and S intersect (A-S) is the point at which the pump will operate—and at that point only. This is so because the pump head adjusts itself to the total system head.

When you are buying a new pump, specify it for maximum efficiency at this point. Also, choose a motor size to give rated horsepower for this point. There is no danger of overloading the motor at a point of lower head and higher capacity farther out on the pump head capacity curve.

These facts remain true, of course, only if the static head and the demand for water remain constant. This premise doesn't hold for many industrial pump applications. Changing conditions change the basic system-head curve. Variations in capacity requirements change the operating point. It is here that selection problems of pump head and capacity arise and this is where the system-head curve proves its value.

There are four ways the engineer can plan to regulate pump capacity. In each case you can use the system-head curve to predict pump performance under operating conditions.

1. Regulation by throttling • You can cut down on pump capacity by throttling a valve on the discharge side. This increases the friction head, and creates a new and steeper system curve. Such is curve M in Figure 2 for a mild throttle, and curve N for a severe throttle. The operating point moves back on the pump curve A (which hasn't changed) from A-S (490 gpm.) to A-M (400 gpm.) or A-N (235 gpm.)

By looking at these same points on curve A on Figure 1, you can see why throttling is inherently inefficient for a pump. At point A-N you require 76% of the power to deliver 48% of the capacity of A-S. So if you are going to use this method of regulation, you will do better to buy a pump that has a relatively flat head-capacity curve. This limits friction-head rise when throttling.

Regulation by throttling has a drawback in that pump capacity cannot be increased beyond the wide-open valve point, or the original design point. You always *increase* the total system head by throttling. You never *decrease* it. So you always back up on the head-capacity curve, and never pass beyond where it intersects system-head curve S. This means that in buying the pump you must specify pump conditions for the *maximum* demand point expected. Then you can throttle the pump to meet *normal* or *lesser* demands.

Factors in favor of valve regulation are low cost, flexibility, and ease of control. But never use a valve on suction side to regulate capacity. To do so increases the effective suction lift, thereby limiting maximum capacity and increasing the danger of cavitation that can result in pitting the pump impeller.

2. Regulation by changing pump speed • This method has the effect of raising or lowering the pump head-capacity curve parallel to the old curve, as shown by curves B (3740 rpm.) and C (3130 rpm.) in Figure 2. The system-head curve remains the same. Capacity is cut from 490 gpm. (point A-S) to 310 gpm. (point C-S), or it's boosted to 610 gpm. (point B-S). For 51% of the capacity of B-S, speed reduction at C-S requires 49% of the power.

If you use this method of regulation, you will do well to specify maximum pump efficiency *at the normal demand point.* You need only to increase pump speed to meet sudden maximum demand requirements. But make sure you install enough driving power to meet the maximum demand.

One disadvantage of speed regulation is the higher initial cost of variable-speed drives. They may cost one-third to one-half again as much as electric motor drives. This limits their use to larger pumping installations where operating economies justify the higher initial cost.

For reasonable speed changes and for points of equal

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But low power cost is only part of the Exide story. In addition, Exide-Ironclad Batteries bring you these important benefits.

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ROUND-THE-CLOCK PERFORMANCE—no mechanical troubles, no unscheduled down time.
UNIFORM SPEED straight through to end of shift.
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efficiency, you can apply the following three rules to determine how change in speed affects the pump characteristic curves:

1. Pump capacity varies directly as the speed.
2. Total head varies directly as the speed squared.
3. Brake horsepower required by the pump varies directly as the speed cubed.

3. Regulation by parallel operation • Plants having wide variations in capacity requirements can use this method. It utilizes two or more pumps usually designed for different capacities along the system-head curve. When the demand exceeds the capacity of the largest pump, various combinations of pumps are operated in parallel, discharging into a common header.

Here's where you've got to watch your step, lest you buy pumps of insufficient capacity. Many an engineer has been caught unawares when he finds that a new pump, designed for the same head as existing units, never operates at that head (or efficiency) in service. You don't casually add pump capacities when planning to operate them in parallel. It's not as simple as that. The system-head curve tells you why.

Look at the curves of a typical parallel operation in Figure 3 on the preceding page. There you see the head-capacity curves of each of two pumps superimposed on a typical system-head curve.

Pump No. 1, a 3-in. pump, when operating singly will deliver 610 gpm. at 124 feet head (point *X*); efficiency is 78%, requiring 24.6 bhp.

Pump No. 2, a 5-in. pump, when operating singly will deliver 950 gpm. at 130 feet head (point Y); efficiency is 80%, requiring 39 bhp.

When operating together the combined capacity is not 1560 gpm. (950 + 610), but 1340 gpm. (point *Z*). The rule is that for a given head the combined capacity of pumps in parallel is equal to the sum of the individual capacities *at that head.* The same rule applies to brake horsepower needs.

Now see how this rule is observed on a system-head curve. The combined head-capacity curve in Figure 3 is the sum of head-capacity curves of pumps No. 1 and 2. But the operating point is where this combined curve intersects the system-head curve (point Z), at an increased head of 144 feet. At that head, pump No. 1 delivers only 515 gpm. and pump No. 2 only 825 gpm. This totals 1340 gpm., not 1560 gpm.

For every pump you add to this parallel system, the combined capacity will operate at a higher head, hence at a lower capacity for each pump. Therefore, in this type of operation you do well to specify pumps with fairly steep head-capacity curves. Thus you will insure delivery and get maximum capacity (without going too far back on the head-capacity curves to meet the higher combined head). Also, the less the change in capacity from designed conditions, the smaller the efficiency change in each pump.

It's best, too, for pumps that are paralleled, to have as nearly the same shutoff pressure as possible. (That's the point where the head-capacity curves intersect the vertical at zero capacity.) This will eliminate the danger of one pump delivering through another when starting up.

Since we have already seen that a pump is designed for maximum efficiency at only one point on its head-capacity curve, the question arises: *Which operating capacity should you chose for both single and parallel operation?*

It's a matter of economics. You can specify a design for that point where the pump will operate most of the time. Or some engineers prefer a design for a point midway between the single and parallel heads, thereby achieving an equal distribution of efficiency.

There is a danger in designing pumps only for the higher head. Cavitation of the pump impeller may occur if the pump is not properly designed to operate at the lower head condition. And there is a point where the difference between the lower and higher heads is so large that one pump can't do both jobs efficiently.

It's up to the manufacturer to decide. He calculates an index that is known as "specific speed," which has become the recognized criterion of pump performance.

Specific speed has been found to be a satisfactory index of cavitation when checked against pump suction lift. The Hydraulic Institute has evolved pump suction lift limitations based on specific speed. These limitations were obtained statistically from a composite picture of the operation of many pumps of different makes and are generally accepted as a good index, though not necessarily true in every case.

You can leave that calculation and decision to the pump manufacturer. What is important for you is to tell the manufacturer when you intend to operate a pump at two heads. For while the specific speed calculations may show that one pump can handle both heads at the same speed, it doesn't follow that the manufacturer will offer such a pump unless he is forewarned.

4. Regulation by changing impeller diameter • Industrial plants with long-range expansion plans frequently use this method. Changing the impeller diameter has the same effect as varying the pump speed. It raises or lowers the pump head-capacity curve parallel to the old curve. Look at curves B and C in Figure 1 for the similarity in effect. Here again there's no change in the system-head curve.

There are limits, of course, in changing impeller diameters. The size of the pump case limits the maximum diameter. The minimum cut at which the impeller will deliver water efficiently limits the minimum diameter. For single-stage, low-specific-speed pumps, the percentage of cut ranges from 20% to 30%.

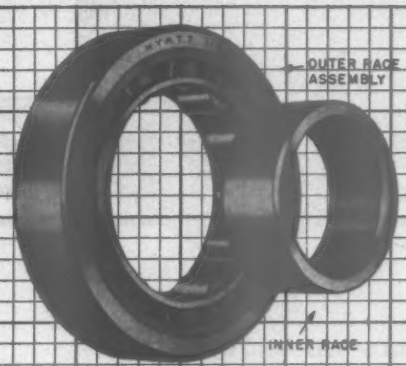
To determine how different impeller sizes affect the pump characteristic curves, you can apply these three rules for points of equal efficiency:

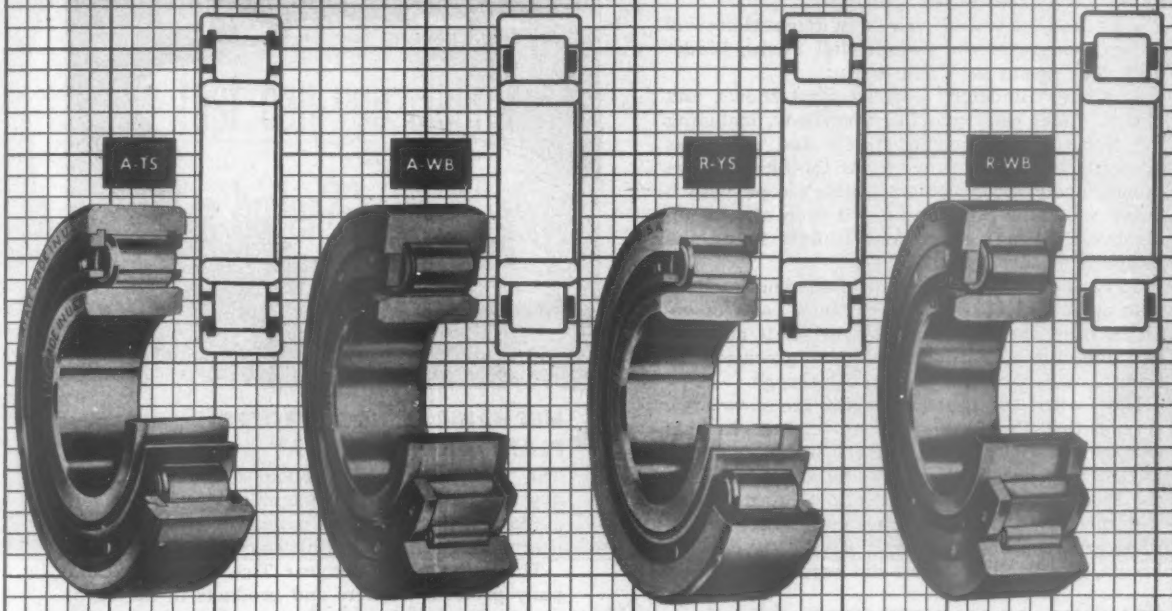
1. Capacity varies directly as the diameter.
2. Total head varies directly as the diameter squared.
3. Brake horsepower varies directly as the diameter cubed.

One disadvantage of this method of regulation is that often you have to select a pump large enough to meet the maximum conditions expected years ahead. Meanwhile that same pump will have to operate off peak efficiency, at a lower head, with a smaller diameter impeller for a long time. Also, if you buy a motor large enough for the ultimate load, you run it at lowered efficiency. So sometimes a new pump is a wiser choice economically.

As in the method of parallel operation, careless increases in speed and impeller diameter may cause cavitation. Always have an expert check the specific speed and suction lift limitations for the new conditions. And by some preliminary plotting of your own of the proposed changes over the system-head curve, you can prevent costly errors.

For Separable Inner Race Bearings-- HYATT HY-LOADS





IN the Hyatt Hy-Load line of solid cylindrical roller bearings there are four types which are made with separable inner races. These inner races are freely interchangeable with any roller assembly of the same number thus permitting non-selective fitting after pre-assembling the two bearing parts in separable machine elements. This Hyatt feature speeds final assembly, permits more efficient production planning and layout, and often leads to improvements in product design.

When a shaft of larger diameter is needed for greater rigidity or a bearing of smaller size is desired, the separable inner race can be omitted and the rollers operated directly on the shaft in instances where the bearing operating surface of the shaft can be of suitable hardness and finish.

In addition to the Hy-Loads with separable inner races there are separable outer race and non-separable types each of which are made in a wide range of sizes.

Full information about all Hyatt Hy-Load Roller Bearings is contained in Catalog 547 . . . a complete engineering guide to radial bearing selection and use. Write for your copy today. Hyatt Bearings Division, General Motors Corporation, Harrison, New Jersey.

HYATT ROLLER BEARINGS

MAINTENANCE POINTERS FOR FACTORY EXECUTIVES

DISSOLVING THE SNOW REMOVAL PROBLEM

You can cut the size of your snow removal crew if the experience of the Saco-Lowell Shops, Biddeford, Me., means anything to you.

In winter Biddeford gets frequent snows, and plenty. After each snowfall everybody, including the Shops, has to clean streets and sidewalks promptly to be able to work. At the Shops, plow, broom, and hand shovelers couldn't cope with a heavy snowfall. It packed down even after a going over. Shop tractors and trailers found the company streets rough going.

So the company tried deicing salt. And to eliminate objections of corrosion of metal parts of vehicles from the splash of salt brine, it added a rust inhibitor. In this case it was green-colored Banox, made by Calgon, Inc., Pittsburgh.

Now, when the snowfall begins the snow crew spreads the salt mixture over the streets. In light snows, the streets remain clear. In heavy snows the snow doesn't pack, and can be pushed aside by the broom. The plow is mostly idle.

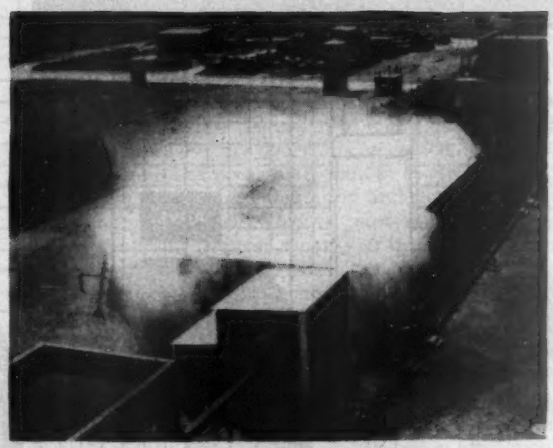
A three-man salt crew, says the Shops, is handling greater snowfalls than the old crew of plow, broom, and hand shovelers did before.

TRAINING OF MAINTENANCE ELECTRICIANS MADE EASIER

If you don't already have headaches like these you will later: shortage of skilled maintenance electricians; shortage of repair parts; increasing plant mechanization that needs more and better electrical craftsman to keep things humming.

How to bring order out of this chaos? Why, by apprentice training, of course; either to improve existing skills, or to develop raw recruits. To do that, your embryo electricians will need a backbone of the knowledge of electrical fundamentals.

When Central Hudson Gas & Electricity Corporation of Poughkeepsie, N. Y., looked around for a brief down-to-earth electrical training course, it ended up by inventing its own. Its industrial engineering manager, Percy Rutledge, took two hard years to put together a 10-unit course on what's a watt. He hit on a semi-technical style that even a department store clerk can understand. But it's also good stuff for industrial apprentices. The course proved a natural. "Simplified Electricity for Utility Workers" is slanted for utility problems. Cost per set is $10.20, from Delmar Publishers, Inc., Albany, N. Y. You can get a teacher's manual for $1.50 extra. Maybe your production supervisors ought to be in on this, too.



MECHANICAL NOSE PROTECTS PLANT NIGHT AND DAY

The "nose" takes a continuous sniff of air around any spot where leaking gas might cause a severe explosion. If the sample is nearing explosive concentrations, a loud horn blows and red lights flash.

That's the way Goodyear Tire & Rubber Company protects workers and products in its Akron plant. This equipment, known as a combustible gas alarm system, was made by Mine Safety Appliances Company, Pittsburgh. At Goodyear it protects such places as the dryers in the Pliofilm plants, the drying towers of the post-dip calender units in the tire plants, and more recently, the butadiene tank farm at the synthetic rubber plant.

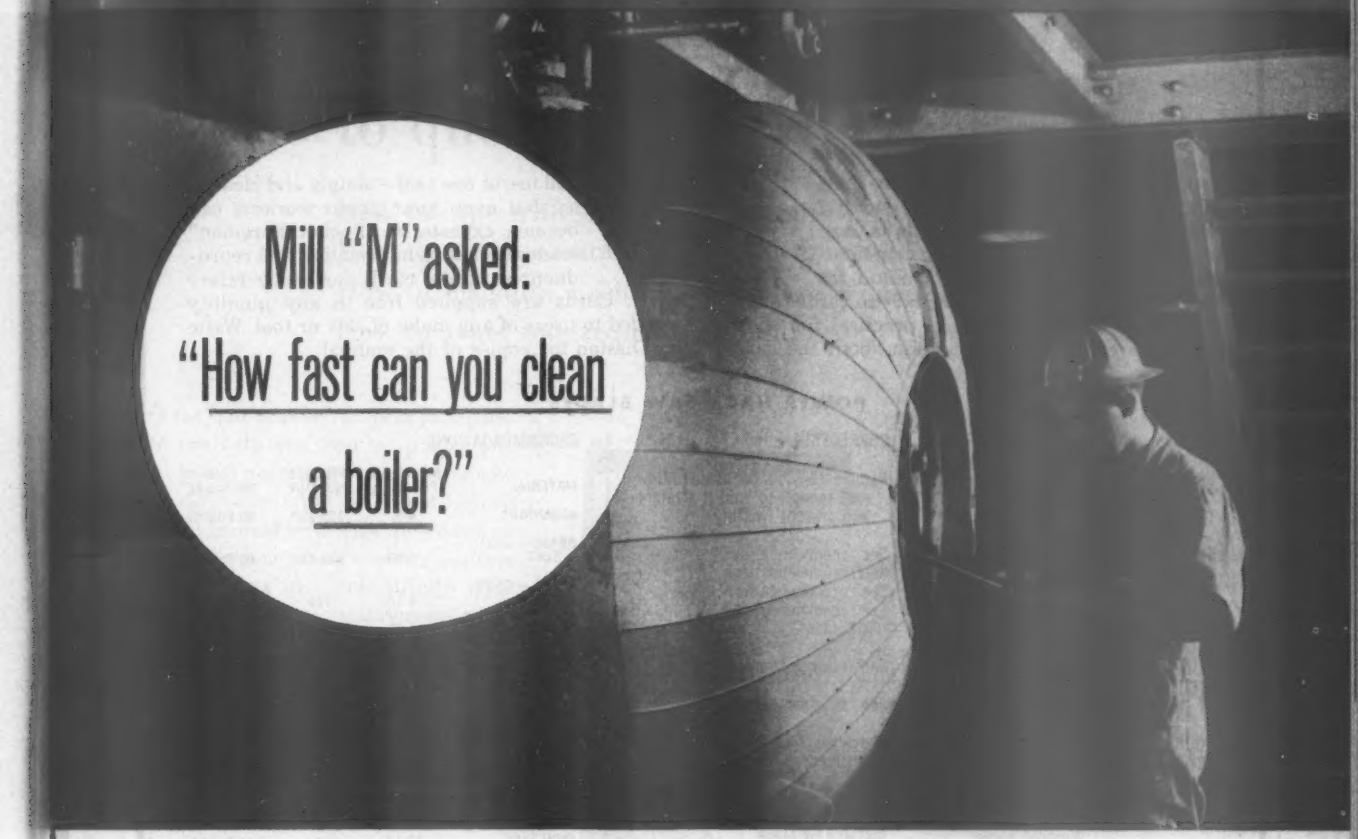
The tank farm system actuates the alarms when a sample concentration reaches 30% of the lower explosive limit. This happened three times in the first nine months. It enabled personnel to locate the leaks quickly, and twirl valves and take other measures to conserve the product and relieve the danger.

Should the concentration ever get out of hand —rise to the point of 60% of the lower explosive limit—the "nose" actuates a waterfog system. Nozzles are angled around the tanks to create an updraft that swirls the gases some 90 feet into the air and disperses the dangerous mixture. Photograph shows waterfog system in action.

Turn to page 200 for ways to solve plant engineering problems

DOWELL SERVICE

CHEMISTRY APPLIED TO MAINTENANCE CLEANING PROBLEMS



Dowell Service cleaned the internal surfaces in 10 hours!

This was the case of a boiler generating 350,000 pounds of steam per hour with an operating pressure of 1250 p.s.i. In ten hours Dowell Service removed an estimated 1,000 lbs. of deposits which were causing tube failures. The boiler was back on the line the next day.

What is Dowell Service? It is simply the application of chemistry to the problem of removing deposits from heat exchangers, water lines and all kinds of process equipment. Dowell engineers fill the equipment with liquid solvents which reach wherever steam and water flow and are designed to dissolve and disintegrate the deposits efficiently and quickly. Dismantling is not necessary.

Somewhere in your plant there is a job that can be done *faster, better, more economically* by Dowell Service. Let an experienced Dowell Service Engineer help you with your maintenance planning. No obligation, of course.

Other recent Dowell jobs:

Entire Piping Systems of two college dormitories cleaned of scale.

•

Three Formaldehyde Contact Towers and Reboilers cleaned and restored to designed operating efficiency.

•

Six Black Liquor Evaporators cleaned for paper company. Deposits removed from vapor and liquor sides in one operation.

CALL

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Atlanta	Louisville	Anniston, Alabama	Lafayette, La.

Long Beach, Oakland, Casper: Dowell Associate—International Cementers, Inc.

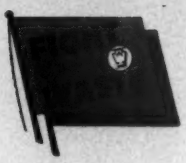
DOWELL

A SERVICE ORGANIZATION

maintenance data sheet 174

Source: HENRY DISSTON & SONS, INC., PHILADELPHIA

How to Make Tools Last Longer



THESE THREE DATA SHEETS teach the ABC's of how to take care of 6 widely used shop tools. The material is taken from new "Fight Waste" instruction cards distributed by Henry Disston & Sons, Inc. There are about 30 4x6-in. cards in all, printed on heavy cardboard—practical for shop use. Each card gives information about the care and use of one tool—simply and clearly, so that even your green workers can become experts. A "Pocket Foreman" manual contains information and reproductions of the cards for ready reference. Cards are supplied free in any quantity needed to users of any make of saw or tool. Write to Disston for copies of the manual.

POWER HACK SAW BLADES

FAILURE	CAUSE	CORRECTION
PULLING OUT AT PIN HOLE	Blade drawn too tight or twisting in cut	Reduce tension on blade. Allow just enough to hold it straight and prevent twisting
PREMATURE WEAR	Feed too heavy	See recommendations
	Speed too great	See recommendations
	Wrong tooth spacing	See recommendations
	Insufficient feed	See recommendations
	Dry cutting	Use coolant
STRIPPING TEETH	Tooth spacing too coarse	See recommendations
	Teeth too fine	See recommendations
CROOKED CUTS	Worn frame, or frame out of line with vise	Check machine for wear and adjustment
	Blade loose in frame	Adjust
	Stock not tight in vise	Inspect clamps and tighten
	Feed too heavy	See recommendations
	Wornout blade	Install new blade
	Hard spot in material	Start new cut. May require a new blade
BLADES BREAKING	Insufficient tension	Make adjustment
	Tooth spacing too coarse	See recommendations
	Feed too heavy	See recommendations
	New blade in unfinished cut	Start new cut
	Side strain on blade	Worn out. Change blade

RECOMMENDATIONS

MATERIAL	NO. TEETH PER INCH	STROKES PER MIN.	FEED PRESSURE
ALUMINUM	4-6	135-150	60 Pounds
BRASS — CAST SOFT	6-10	135-150	60 Pounds
BRASS — CAST HARD	6-10	135	60 Pounds
CAST IRON	6-10	135	120 Pounds
COPPER	6-10	135	120 Pounds
TOOL STEEL	4-6-10	90	120 Pounds
COLD ROLLED STEEL	4-6	135	150 Pounds
HIGH SPEED STEEL	6-10	90	120 Pounds
MACHINE STEEL	4-6	135	150 Pounds
IRON PIPE	10-14	135	120 Pounds
STRUCTURAL STEEL	6-10	135	120 Pounds
TUBING — STEEL	14	135	60 Pounds
TUBING — BRASS	14	135	60 Pounds

HAND HACK SAW BLADES

FAILURE	CAUSE	CORRECTION
PULLING OUT AT PIN HOLE	Blade too tight or twisting in cut	Reduce tension. Allow just enough to hold blade straight and prevent twisting
STRIPPING TEETH	Tooth spacing too coarse	See recommendations
BLADES BREAKING	Insufficient tension	Make adjustment
	Tooth spacing too coarse	See recommendations
	New blade in unfinished cut	Start new cut
	Side strain on blade	Do not bend frame sideways
	Twisting blade	Use firm, straight stroke
PREMATURE WEAR	Pressure on back stroke	Lift slightly on back stroke
	Insufficient pressure	Cut slowly with pressure on forward stroke

RECOMMENDATIONS

NO. TEETH PER INCH	KIND AND TYPE OF MATERIAL
14	For materials equivalent to one inch round or more—aluminum, brass, bronze, cast iron, copper, cold rolled steel, structural steel, rails, etc.
18	For materials ¼ to 1 inch in diameter. Also tool steels, drill rod, cold rolled steel, and medium weight structural shapes.
24	For materials ⅛ to ¼ inch in thickness. Also pipe and tubing, BX cable, heavy sheet metal, mouldings, etc.
32	For materials less than ⅛ inch in thickness. Also tubing, BX cable, sheet metal, mouldings, etc.

It is suggested that blades of the flexible type be used where the operator is required to assume an awkward position, such as on a ladder. This situation often confronts electricians, plumbers, and garage mechanics.

More on page 128

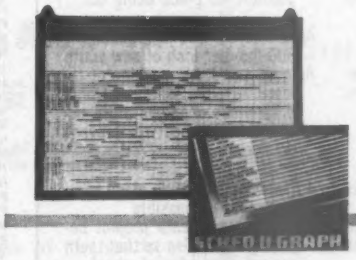
There's NO "pat answer"

to questions like these....

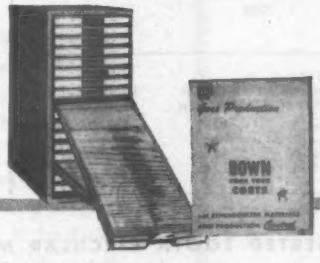
How to cope with scarcities of "Controlled Materials"
How to assure accurate production forecasting
How to schedule machine loads more economically
How to avoid too-frequent tool and set-up changes

There's no "pat answer" to these problems. But we *can* help you step up production, reduce your operating costs, eliminate specific difficulties. And we're not limited to any one method or device, or even to a few. We make them *all*. We're in a position to approach your problems strictly from the standpoint of your requirements, your best interests, and to recommend the *right* manual or machine methods, and time-saving forms and equipment.

Briefly described here are three booklets, each containing proved-in-use answers to typical production control problems. Send for the one that interests you most... better still, let us give you *all three*.



This 32-page book on SCHED-U-GRAPH outlines a practical, low-cost system for handling machine load on a job-shop basis... production scheduling for continuous operation... and inventory control for production-line set-ups. In all these jobs — and others too — Sched-U-Graph usually pays for itself within a few weeks!



"UP Goes Production, DOWN Come Your Costs" shows how KARDEX gets results in forecasting requirements... in cost analysis... in charting visually *all* essential production facts, either by hand-posting or combined with Sched-U-Graph or Punched-Card Accounting.

Which one of these methods—or which combination—is the practical question that matters. Your local Remington Rand office can give you an impartial answer. Because...

This book on PUNCHED-CARD ACCOUNTING, written by and for factory men, shows how quickly *machines* can give you reports on the many facts needed for production control. Punched cards produce at lowest cost all these reports: engineering bills of material, scheduling, materials control, progress control.

For your needs we have no reason to recommend anything but the right machines and systems. We make them all

Remington Rand INC

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FLEXIBLE BACK METAL BAND SAWS

FAILURE	CAUSE	CORRECTION
STRIPPING TEETH	Tooth spacing too coarse	See recommendations
	Starting cut at extremely thin section of material or on a corner	Start cut where several teeth will contact material at same time
LOSS OF SET PREMATURE WEAR AND	Speed too fast	See recommendations
	Rubbing in guides or riding on wheels	Adjust so that teeth project beyond guides; also so that teeth project over edge of wheels
BREAKING	Twisting in the cut	If irregular cutting, use proper width saw for radius
	Misalignment of guides	Align top and bottom guides
	Guides set too far apart, allow band to twist	Always adjust guides as close as possible to piece being cut
	Insufficient tension	Adjust tension to approximately 300 lbs. per inch of saw width
	Allowing band to remain in tension when not in use	Remove saw from machine or release tension. Where extreme differences of temperature occur, this practice will prevent breakage
CUTTING OUT OF LINE	Misalignment of guides	Adjustment should be made
	Spacing of guides	Set as close as possible
	Set worn on one side due to contact with wheels or guides	Adjust so that teeth project beyond guides; also so that teeth project over edge of wheels
	Feed too heavy	Reduce feed or use coarser tooth saw

Width of Band Saw	To Cut Minimum Radius of	Width of Band Saw	To Cut Minimum Radius of
1/8 in.	1/4 in.	1/2 in.	2 1/4 in.
3/16 in.	7/16 in.	5/8 in.	3 in.
1/4 in.	3/4 in.	3/4 in.	4 1/2 in.
3/8 in.	1 1/2 in.	1 in.	8 in.

RECOMMENDATIONS for cutting specific materials

MATERIAL	NO. TEETH PER INCH	SPEED OF BLADE, FT. PER MIN.
Aluminum solids	8-10	800-2500
	3-4*	3000-5000
Sheets	8-10	1000-3000
Aluminum alloys—Solids	8-10	100-150
Irregular shapes	12-14	200-300
Asbestos sheets	8-12	150-200
Babbitt	10-14	1000-1500
Bakelite	8-10	800-1000
Brass castings—Soft	10-14	700-1500
Hard	10-14	200-500
Brass sheets and tubing	14-18	700-1500
Bronze—Bars	10-14	150-350
Castings	10-14	300-800
Mouldings	14-18	500-1000
Cast Iron	12-14	100-125
Catalin	12-14	700-800
Copper	8-12	500-1000
Copper—Nickel	12-14	70-90
Everbright	10-12	150-350
Everdur	10-12	150-350
Fibre	8-10	300-500
Formica	8	300-500
Hose—canvas and rubber	8-10	500-1000
Hose—metallic	18-24	250-500
Inconel	10-12	70-90
Iron bars	12-14	100-125
Iron sheets (under 1/8")	14-18	100-250
Magnesium	3-4*	3000-5000
Metal wood	12-14	300-750
Mica	10-12	300-600
Micarta	8	300-500
Monel metal	10-12	100-150
Nickel silver	18-24	100-150
Pipe	14-18	100-200
Plastic	3-12	1500-1600
Radiator core	18-24	150-400
Rubber—hard	10-14	150-200
Slate	10-14	100-150
Steel—Chromium	12-14	90-125
Cold rolled	10-12	100-125
Drill rod	14	100-125
Heat resistant	12-14	90-125
High-speed	12-14	90-125
Machinery	10-14	100-125
Manganese	10-12	90-100
Nickel	10-14	90-125
Structural	10-14	90-125
Tool	12-14	100-125
Tubing	14-18	100-150
Textolite	8	300-500
Transite	8-12	100-200

*Buttress Tooth Pattern

INSERTED TOOTH CIRCULAR METAL SAWS

FAILURE	CAUSE	CORRECTION
TOOTH BREAKAGE	Improper sharpening	See manufacturer's instructions
	Teeth dull	Sharpen saws before dull teeth cause dragging in cut
	Stock slipping	Be sure stock is rigidly clamped
	Feed too fast	See recommendations
	Chatter	Remove back-lash in gears or worm drive. Tug pins or key should fit snugly in saw pin holes or keyway
	Wrong tooth spacing	Tooth spacing is right when two or more teeth are in cut
PREMATURE WEAR	Speed too fast	See recommendations
	Insufficient or improper coolant	Insure full flow of proper coolant
	Irregular feed	Check machine and overhaul
CUTTING OUT OF LINE	Improper grinding	When sharpening, be sure that face and tops of teeth are ground square with blade, and that saw is round
	Machine misalignment	Be sure saw travels at right angles to work clamps

RECOMMENDATIONS for feed and speeds

MATERIAL	RIM SPEED Ft. Per Min.	FEED Sq. In. Per Min.
Steel	40	2 1/2 to 10
Cast Iron	40	5
Brass	500	80
Copper	750	60
Aluminum	1200	90

In general, the feed depends a great deal on the hardness of the stock to be cut; the harder the stock, the slower the feed.

More on page 130

NEW **CLASS H*** **MOTORS PROTECTED BY DOW CORNING SILICONES**

... the insulation that has already saved industry millions of maintenance dollars plus the hourly output of hundreds of thousands of men!

This most timely announcement caps the test program we started 8 years ago when silicone resins were introduced by Dow Corning Corporation. First we proved by accelerated life testing that silicone insulated motors had a good 10 to 1 advantage in life expectancy and wet insulation resistance. Then we sold silicone (Class H) insulation to the manufacturers of electrical equipment ranging from lift truck and traction motors to solenoid and brake coils. We also encouraged the better rewind shops to rebuild hard working industrial motors with Class H insulation.

Now we can proudly refer American industry to this goodly list of electrical manufacturers, all able and willing to supply electric machines protected by Class H insulation made with Dow Corning Silicones.

Take your special problems to the application engineer representing any of these companies or to our Product Development Engineers.

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THE LOUIS ALLIS CO.

The Reliance Electric & Engineering Company

THE B-A-WESCHE ELECTRIC COMPANY (WELCO)

WESTINGHOUSE ELECTRIC CORPORATION

***"Class H" insulation is the kind of insulation that keeps motors running in spite of "Hell and High water."** (slanguage dictionary)

DOW CORNING CORPORATION

DOW CORNING SILICONES

MIDLAND, MICHIGAN

maintenance data sheet 176

How to Make Tools Last Longer . . . begins on page 126

CARBOLOY* SAWS

FAILURE	CAUSE	CORRECTION
TOOTH BREAKAGE	Striking foreign objects	Use more care than when using steel saws. Do not knock against steel table or wrench when tightening nut
	Saw slipping on arbor	Tighten collars securely
INSUFFICIENT LIFE BETWEEN SHARPENINGS	Improper sharpening	Use only diamond impregnated wheels recommended for Carboloy
PREMATURE WEAR	Poor equipment	Operate Carboloy saws only on rigid, well-built machines
	Careless handling	Use extreme care
	Incorrect saw	Carboloy saws are designed for a particular application. Do not attempt to cut all sizes and kinds of material with any one saw

CARE AND MAINTENANCE

The Carboloy saw requires careful handling; therefore, accuracy in sharpening cannot be overstressed if maximum service and life are to be expected. When it is realized that Carboloy-tipped saws will do from 50 to 250 times as much cutting as carbon or high-speed steel saws per sharpening, depending upon the material cut—the user can well afford to spend more time and exercise more care when sharpening. In grinding Carboloy-tipped saws, the wheel should be fed against the cutting edge and not away from it. The pressure exerted against the wheel should not be great, otherwise the wheel will glaze, producing excessive heat, which will result in surface cracks and checking of the Carboloy. The wheel should be dressed frequently to insure a keen, sharp surface. To obtain the best possible results, the Carboloy-tipped saw should be diamond lapped to bring the teeth to keen edges.

*@Carboloy Co., Inc.

MACHINISTS' FILES

FAILURE	CAUSE	CORRECTION
STRIPPING TEETH	Choppy or fast stroke	Use long, steady, uniform stroke
	Wrong file for job	See recommendations
	Too much pressure	File lightly at first, as a new file bites into the work more easily
	Work held improperly	Hold work securely in vise
PREMATURE WEAR	Improper pattern, size, or cut of file	See recommendations
	Dragging file on return stroke	Raise file slightly on return stroke
	Filing too fast (or running work in lathe too fast)	Use steady, long, uniform stroke. Reduce speed so file does not slide or glaze
	Too much pressure	Ease up on filing stroke
	Too little pressure	Exert enough pressure on file to keep it cutting at all times. Do not let it slide
	File clogging	Use recommended file; clean with file card and brush
	Rusty file	Protect file when not in use
	Careless handling	Respect your file
BREAKAGE	Cleaning file by knocking against vise	Use file card and brush
	Careless handling	Do not drop or use as a lever
	Too much pressure	File lightly at first
CLOGGING	Improper tooth and cut	See recommendations
	Soft or tough, gummy materials (lead, brass, aluminum, etc.)	Draw file back lightly on the return stroke so as to clean the teeth
	Too much pressure	File lightly at first
	General clogging	Use a file card and brush to remove all chips that lodge in the teeth. By chalking cutting teeth, clogging can be eliminated and smoother work produced with less scoring

RECOMMENDATIONS

ROUGHING

Where rapid removal of metal is the object, Bastard Files should be selected; however, where the work is of thin gage or light stock, choose a Second Cut or Smooth File with teeth of finer spacing, for filing across the thickness.

FLAT SURFACES — Flat, Hand.

HOLES — Round, Square, Three Square, Half Round.

CORNERS — Round, Square, Three Square, Half Round.

SLOTS — Knife, Pillar, Warding.

FINISHING

Where work is to be smoothed or finished, select Second Cut or Smooth Files. All thin and hard materials require Smooth Files.

FLAT SURFACES — Flat and Hand Smooth. A Mill Bastard or Mill Second Cut is more desirable for a very smooth finish.

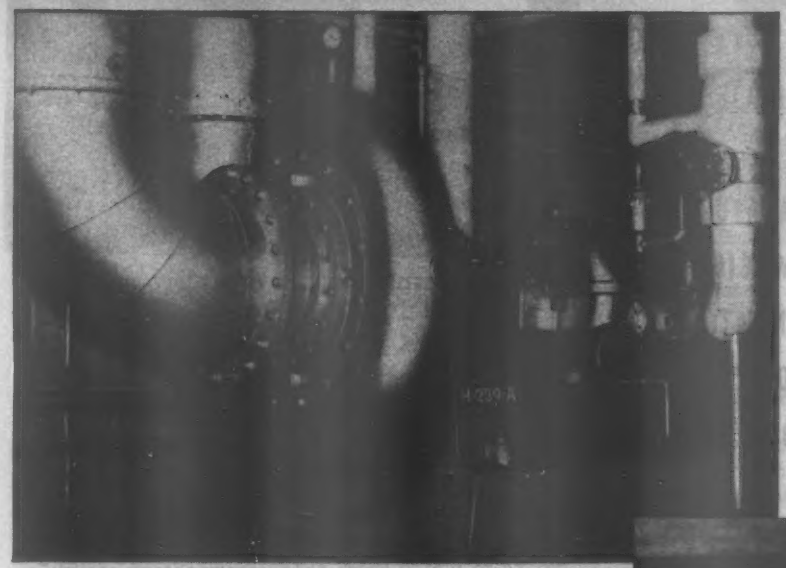
LATHE — Flat, S.C.; Flat, D.C.

HOLES — Round, Square, Three Square, Half Round.

CORNERS — Round, Square, Three Square, Half Round.

SLOTS — Knife, Pillar, Warding.

"always glad to see you... but we seldom need help!"



CENTRIFUGAL

Type OIB Centrifugal Blower used for processing in a large eastern plant. Capacity 12,000 cfm. Similar R-C Blowers are utilized in other plants of this company.

The works manager of a large plant made this friendly statement to a Roots-Connersville representative. What he really meant was that R-C Blowers and related equipment perform so satisfactorily and dependably that they seldom need anything more than routine inspection by his own men.

In large and small plants, in every industry, R-C products uniformly give this kind of reliable operation. They continue to deliver rated capacities, year after year, with a minimum of maintenance—whether a small Rotary Positive Blower of 5 cfm capacity or a Centrifugal unit moving up to 100,000 cfm. And remember, only Roots-Connersville gives you this dual-choice.

If you are planning a new plant, expansion, or replacements, R-C engineers will work with you to select the equipment best fitted to your needs. Almost a century of experience is at your service.

ROTARY

One of two Type RCDH Rotary Positive units in vacuum service in a power plant. Capacities 3,380 cfm. and 3,490 cfm., respectively.

ROOTS-CONNERSVILLE BLOWER CORPORATION
510 Central Avenue, Connersville, Indiana

ROOTS-CONNERSVILLE

BLOWER BUILDERS SINCE 1854

ONE OF THE DRESSER INDUSTRIES

WHAT'S NEW IN EQUIPMENT... BRIEFED HERE

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IN THE NEXT ISSUE

Some notes on important late items. More about them next month.

Drive Belt With Teeth • A rubber and fabric belt with teeth in it may add another page to power transmission history. Regular spaced rubber teeth along its inner surface engage in corresponding pulley grooves. You get no-slip drive, quiet operation, and split-second timing at speeds up to 16,000 fpm.

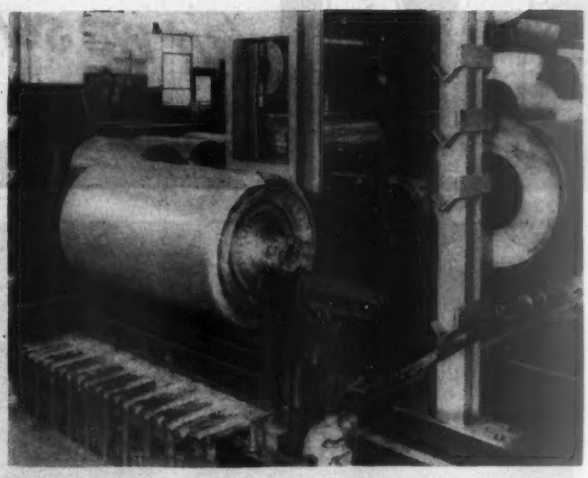
U. S. Rubber Co., Rockefeller Center, New York 20.

Atmospheric Pollution Tester • Controlled amounts of air are sampled by this compact tester to determine the concentration of contaminants in the atmosphere.

W. B. Connor Engineering Corp., 500 Fifth Ave., New York 18.

Cold Cathode Ultra-Violet Lamp • Long life (over 10,000 burning hours) and cool operation (at slightly more than body temperature) make Blacklite an innovation in ultra-violet fluorescent lighting. Use it for detecting surface flaws and in magnetic particle inspection.

Scientific Instrument, Inc., Box 92 Homecrest Sta., Brooklyn 29.



1 **STAK-RAK SEQUENCE** is controlled through a push-button pendant by an operator (not shown). First, lift picks roll from incoming truck.

Crane-Mounted Lift

BY MOVING your lift trucks out of your storage aisles, The Chicago Tramrail Company offers to double your available storage space. That's what they've done with Stak-Rak—a storage system based on a crane-mounted electric lift and a network of self-standing rack columns.

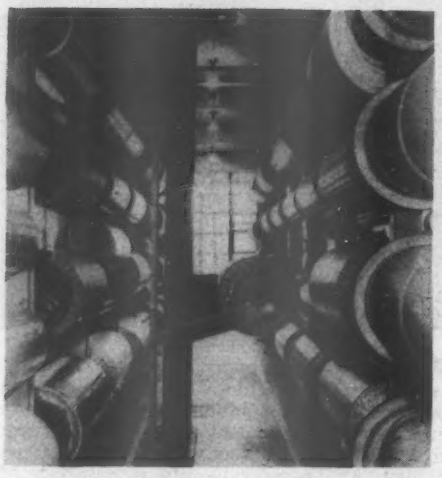
Stak-Rak is designed as a one-man operation to transfer material in and out of storage. The lift attachment is mounted on a trolley that runs along an overhead crane. From the time material is picked up by Stak-Rak until it's deposited on the racks, one

Pneumatic Hoist

The new PT pneumatic hoist has a standard electric hoist mechanism, but is powered by a rotary, vane-type air motor. The motor has a rotor and four sliding vanes which automatically take up their own wear, providing pulseless operation and smooth hoisting. The two basic hoist styles have either pendant hook or monorail trolley.

Five models range from 250- to 2000-lb. capacity with an 11-ft. hook lift. The 2000-lb. pendant hook unit with a lift rate of 12-15 fpm. at 80-90 psi. throttle pressure weighs 110 lb. Air motor operation makes these hoists practical for materials handling applications in explosive atmospheres.

Detroit Hoist & Machine Co., 8231 Morrow St., Detroit 11.



2 **ROLL THEN MOVES ON** crane-mounted trolley to proper aisle. Next the crane runs load down aisle to selected rack.

3 **AT JOURNEY'S END,** Stak-Rak moves in and deposits roll on special storage supports. Lift frame can also be rotated 180 degrees to service the other side of the aisle.

Doubles Available Storage Area

man, walking the load with a pushbutton pendant control, regulates all travel—the vertical rise of the lift, trolley travel along the crane, crane movement down the aisle, and rotation of the lift to either side.

The flexibility of travel is the factor that fully utilizes storage space. Aisle space is said to be one-half of that required by ordinary fork trucks. Aisle requirements for loads up to 2000-lb. capacity are the actual physical dimensions of the unit handled plus 8 inches for the column and necessary running clearance. Stak-Rak will stack to a height of 20 feet.

The system pictured above is handling rolls and spools. But with different lift attachments and rack fixtures, Stak-Rak can be adapted to handle palletized loads, drums, bar stock, etc., as well as skid boxes and other self-stacking fixtures.

Four available models have capacities of 1000, 2000, 3000, and 4000 lb. Standard 4000-lb. model is equipped with 36-in. fork. For lighter capacities fork length can be increased to as much as 5 feet.

Chicago Tramrail Corp., 4000 W. Washington Blvd., Chicago 24, Ill.

Double-Drum Magnetic Separator

The latest Dings permanent-magnet separator is recommended for processing nonferrous chips and fine borings containing less than 10% iron contamination. Unit incorporates two Alnico magnet drums, one mounted directly above the other, in a dust-tight housing. A nonribbed armor-plate drum shell revolves around each magnetic drum.

Nonmagnetic material flows over the drum shell in normal trajectory. Magnetics are held fast to the shell surface for one half revolution, until carried beyond the magnetic field and separately discharged. Material is turned over in passing on to the second drum for more effective secondary separation.

Dings Magnetic Separator Co., 4740 W. Electric Ave., Milwaukee 46.

Cable Hoist With Enclosed Motor

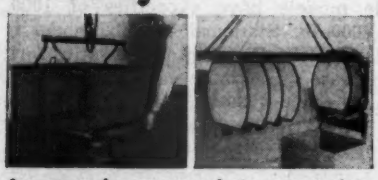
The motor in the Bob-Cat line of electric cable hoists is totally enclosed within the cable drum. This design feature is said to reduce greatly overall dimensions and afford substantial weight saving. Motor is completely protected from moisture, splashing liquids, and corrosive and dust-laden atmospheres. A swing-out transformer panel in the motor housing provides easy access for servicing and adjusting the motor brake.

Hoists come in ½-, 1-, 1½, 2-, 3-, and 5-ton capacities. Operation is on 220, 380, 440, or 550 volts 3 phase, 60-cycle line with either pendant rope control or pushbutton control on pendant cable.

The Cleveland Chain & Mfg. Co., Broadway & Henry Sts., Cleveland 5, Ohio.

More on next page

Why look further for special metal assemblies? Call *Cambridge* your approved source for properly designed crates, trays, baskets, racks or fixtures--expertly fabricated from any metal or alloy...



for processing your products or materials, in bulk, through liquids, heat, gases or corrosive agents.

Submit your own blueprints for quotation, or merely give us the details of the process for which the assembly must be designed. Our trained engineers and metalworkers will do the rest.

Look under "Baskets—Wire" in your Classified Telephone Directory to call your Cambridge Field Engineer, or write direct.

Ask for FREE folder describing Cambridge facilities for special metal fabrications.

The Cambridge Wire Cloth Co.
Dept. E • Cambridge 2, Md.

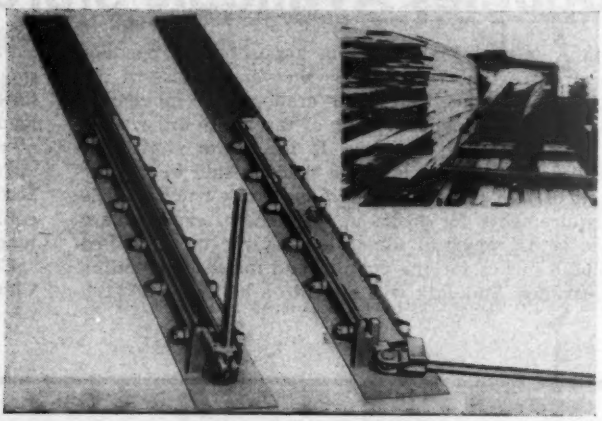
WIRE CLOTH | METAL CONVEYOR BELTS | SPECIAL METAL FABRICATIONS

OFFICES IN PRINCIPAL INDUSTRIAL CITIES

Automatic Pallet Loader

Package-handling conveyor systems don't have to bog down into a time-wasting manual loading of pallets. The Alvey loader takes packages from two right-angle conveyor lines, arranges them in predetermined patterns, and stacks interlocking layers into a sturdy pallet load. An operator maintains a supply of pallets and removes loaded pallets from the machine. The Alvey loader will stack packages 20x13x13 in. or less in 5, 7, and 8 case patterns to a height of 70 in. Maximum pallet size is 38x44 in.

Alvey Conveyor Mfg. Co., 9301 Olive St. Rd., St. Louis 24.



Dolly for One-Side Loading of Flatcars

Loading railroad flatcars from one side by fork lift truck is often a tough nut to crack. A new solution to the problem—one that the maker says may cut your present loading time by 75%—is the Monarch-Holm dolly system.

This dolly setup consists of two carriages, each with 12 2-in. wheels, and two steeel riding strips on which the carriages run. A hinged support bar, running the full length of each carriage, can be either placed flat or locked on edge in a vertical position.

To load, you lay the steel strips across the car and place a dolly on each with the support bars locked upright. The load is deposited on the bars and the dollies rolled against stakes at the far side of the car. The locking handles are pulled down, dropping the load onto wooden stringers. You then pull the dollies out to load another section of the car. Once the first deck is loaded, the operation is repeated to position a second tier.

Monarch Forge & Machine Works, Portland, Ore.

More on next page

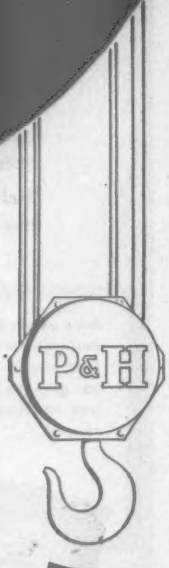
Why P&H *Job-Engineered* Cranes mean better service for you

When you buy a P&H Overhead Crane, you buy proved performance. Your crane will be *engineered* to meet the requirements of your specific job — coordinated with P&H electrical equipment, designed . . . not adapted . . . for crane service. There will be ample reserve capacity, adequate service life, maximum safety and every modern operating advantage. All these combine to give you long years of crane service with the least trouble and maintenance cost.

P&H Magneterque® control for AC cranes brings you one of the most important improvements of the past 20 years. Ask your P&H Sales Engineers about it.

These are Added Values which P&H has learned to put into the building of overhead cranes through 65 years of progressive leadership. Perhaps that explains the overwhelming preference for P&H Cranes.

®T.M. of Harnischfeger Corporation for electro-magnetic type brake.



P&H

OVERHEAD CRANES

4525 West National Avenue

Milwaukee 14, Wisconsin

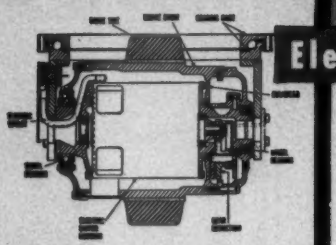
HARNISCHFEGER

Write for your copy of Bulletin C-39 describing P&H Magneterque Control for AC cranes.

6,000 P&H CRANES SERVE AMERICAN INDUSTRY — FAR MORE THAN ANY OTHER

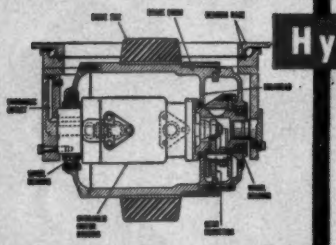
Give
MORE Power to Manpower
use CLARK powered HAND TRUCKS

ONE BASIC DESIGN
TWO POWER TYPES



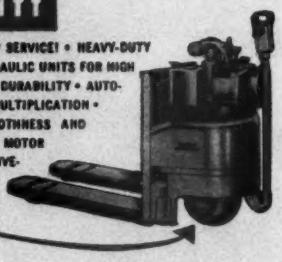
Electro-lift

MORE POWER! • AUTOMATIC ACCELERATION • TAKES BATTERY UP TO 19-PLATE • SHORTEST TURNING RADIUS • FIRST IN GRADABILITY, IN ACCESSIBILITY FOR MAINTENANCE • MOTOR MOUNTED IN DRIVE-WHEEL



Hydro-lift

• 24-HOUR RAMP SERVICE! • HEAVY-DUTY VANE-TYPE HYDRAULIC UNITS FOR HIGH EFFICIENCY AND DURABILITY • AUTOMATIC TORQUE MULTIPLICATION • TOPS FOR SMOOTHNESS AND EASY CONTROL • MOTOR MOUNTED IN DRIVE-WHEEL

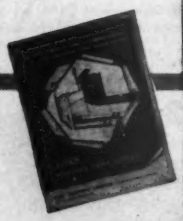


There's A SURE WAY TO GIVE MORE POWER TO MANPOWER!—Simply install Clark Powered Hand Trucks. You multiply many times over the amount of work a man alone can do. The men are better satisfied, too—and they're worth more to themselves as well as to you. Production is boosted, accidents and injuries are decreased, employee relations are improved, economy is strengthened.

Rich returns in time and money available to you in these revolutionary new materials-handling machines—

✓ *Be sure to see the* CLARK EXHIBITS *at the 4th National Materials Handling Exposition, Chicago, April 30-May 4, 1951.*

More power for your manpower can start with our Hand Truck Book. We'll be glad to send you a copy on request.



CLARK ELECTRIC AND GAS POWERED FORK TRUCKS
AND POWERED HAND TRUCKS · INDUSTRIAL TOWING TRACTORS

INDUSTRIAL TRUCK DIVISION • CLARK EQUIPMENT COMPANY • BATTLE CREEK 12, MICHIGAN
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Street_____
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MATERIALS HANDLING EQUIPMENT

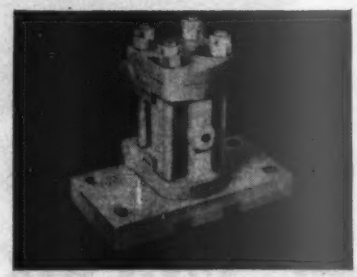
Begins on page 132

Reinforced Steel Dock Transfer Plates

This Easyload transfer plate, permanently built into your loading platform, can be simply and accurately positioned for truck loading. Built of checkered floor plate for safety grip traction, it's reinforced with welded steel ribs underneath to add strength and rigidity.

When not in use Easyload is part of the dock floor, flush with the surrounding area. When needed for loading, two men can move the plate into position with detachable lever arms. It can be extended 20 to 34 inches beyond loading dock. Available in 5 sizes ranging from 3500 to 15,000-lb. capacity.

Wm. Christensen Co., Inc., York, Pa.



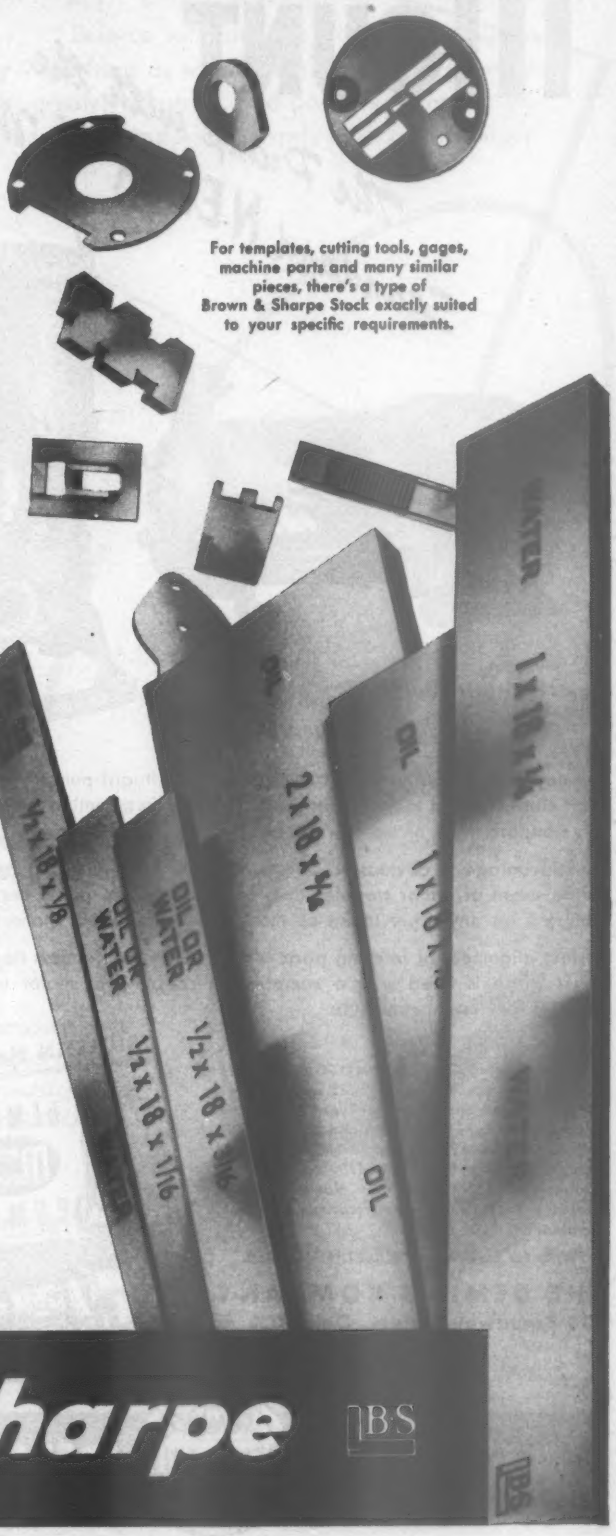
Pneumatic Vibrator for Quiet Operation

Operating without piston impact at either end of the cylinder, the EM Quiet-Type bin and hopper vibrator has no metal-to-metal pounding, no springs, and no troublesome noise. With heavier pistons and longer strokes, these vibrators are said to produce a more intense vibration at a much lower noise level than old-style impact vibrators. Maintenance and repair of end plates and bolts is said to be practically eliminated, too.

Units come in 1⅝ to 4-in. sizes—interchangeable with any bolted-

Now available for oil hardening in entire range of thicknesses...

Brown & Sharpe Ground Flat Stock



For templates, cutting tools, gages, machine parts and many similar pieces, there's a type of Brown & Sharpe Stock exactly suited to your specific requirements.

To give you even greater benefits from the money-saving, time-saving advantages of accurately pre-ground stock, Brown & Sharpe offers a choice of oil or water hardening steel in 16 different thicknesses from 1/64" to 1".

In eight thicknesses up to and including 3/16", a single type of ground flat stock now serves for hardening in either oil or water . . . a distinct Brown & Sharpe feature.

With this complete range of 145 stock sizes, you can meet a wide variety of requirements. Stock for oil hardening is for parts with intricate sections, sharp corners or abrupt changes in form . . . for water hardening, where slightly higher hardness is needed.

Continuous, repeat markings of type on each piece of Brown & Sharpe Ground Flat Stock make identification easy. Protective envelopes in different colors simplify handling.

Write for new descriptive folder. Brown & Sharpe Mfg. Co., Providence 1, R. I., U. S. A.

We urge buying through the Distributor

Brown & Sharpe BS

MOTOR MOUNT

The Pump with the Standard NEMA "C" Motor

Type "H" Horizontal Unit

Type "V" Vertical Unit

The new Deming Standard "MOTOR-MOUNT" centrifugal pump has its own shaft close-coupled to the motor shaft. This permits mounting the pump on any standard make of motor which has the NEMA type "C" mounting flange.

The advantage is obvious: a minimum delay in a pumping operation in the event of motor trouble. In a few minutes, the pump can be re-mounted on any other make of motor of the required characteristics.

Perfect alignment of rotating parts is assured by the stainless steel pump shaft which is fitted with a compression coupling at motor end and tapered for the impeller hub.

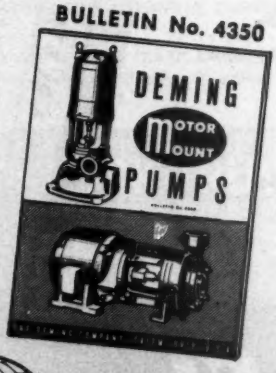
* * * * *

The new Deming Standard "MOTOR-MOUNT" centrifugal pumps are made in 25 units of Type "H" (Horizontal) and 25 units of Type "V" (Vertical) in a range of capacities up to and including 200 gallons per minute; heads up to 165 feet; motors from ¾ to 7½ H. P., Speeds 1750 to 3500 rpm. Maximum total pressure 125 lbs. Maximum suction pressure 50 lbs. Maximum recommended liquid temperatures 200° F.

Write for free copy of BULLETIN No. 4350.

THE DEMING COMPANY
530 Broadway, Salem, Ohio, U.S.A.

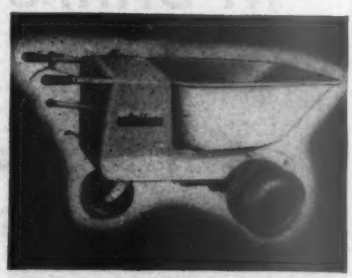
BULLETIN No. 4350



DEMING DEPENDABLE PUMPS

type vibrator. Maker will supply data sheet on request.

Cannon Vibrator Co., 1108 Power Ave., Cleveland 14, Ohio.



Powered Wheelbarrow

The 5 horsepower packed by this wheelbarrow will save many man-hours in materials handling operations—indoors or out under continuous heavy duty. Redesigned unit features enclosed gasoline engine and tank mounted at rear top of chassis—away from floor dirt; forward direct drive with half speed reverse under power; and conveniently located controls.

Two sizes of staked platforms are interchangeable with the bucket. Capacity is 1500 lb., bucket or platform load. Barrow turns on 33-in. radius. Maker claims ample power for taking steep ramps.

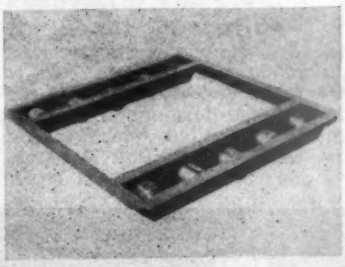
Prime-Mover Co., Muscatine, Ia.

Double-Hook Hoist

In handling long items in quantity, and in lifting and controlling the dumping of heavy barrels and drums, the Flinchbaugh double-hook hoist is right at home. It can also be adapted for tub handling of loose materials. Complete unit includes reversing motor, trolley, cable, and hooks.

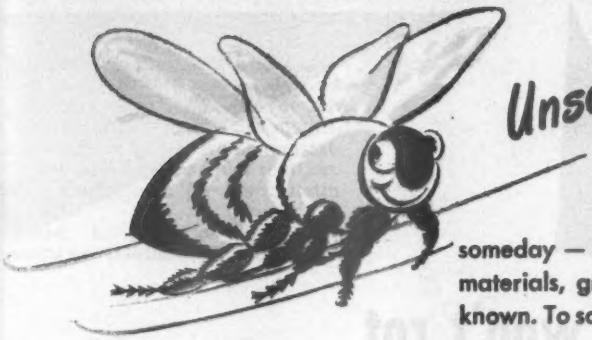
Hooks are regularly spaced 48 in. apart, but can be adjusted closer together. Adjustable trolley wheels are said to fit any size or make of track, and to travel any size curve. Hoist can lift 500 lb. at 25 fpm.

Flinchbaugh Co., York, Pa.



Reefer Pallet Roller

Designed for the narrow door openings and slatted deck construction of refrigerator cars, this steel-



Unsolved: How can a Bumblebee fly?

Science will catch up with the bumblebee someday — perhaps as we develop lighter and stronger materials, greater accuracy, and power sources yet unknown. To solve the impossible merely takes a little longer.

Solved: A synthetic O-Ring plus leather back-up operates successfully at 3,000 P.S.I.

The principle of pressure sealing by means of a toroid has been recognized for many years. But today's successful application of O-Rings was made possible by the co-operation of many people . . . industrial chemists, design engineers, metallurgists, production engineers *and the men who make packings* . . . working together to produce new compounds, better design and greater accuracy to meet exacting needs.

Graton & Knight have played an important part in this development. Early in this century, Graton & Knight were masters of precision-engineered molded leather packings, and were ready with a wealth of skills and experience when they entered the field of synthetic rubber packings.

In 1949 the Company consolidated its packings laboratory, engineering and manufacturing facilities in its affiliate company, International Packings Corporation. Here, backed by G&K resources and experience, synthetic packings made by G&K-INTERNATIONAL are advancing their position in modern industry.

G&K-INTERNATIONAL O-Rings meet all J.I.C. Standards. Design, application, manufacture and delivery to *your* high standards are *our* business. Let's get together.

GRAKONE *Synthetic O-Rings*

INTERNATIONAL PACKINGS CORPORATION
Bristol, New Hampshire
GRATON and KNIGHT COMPANY
Worcester, Massachusetts

100 YEARS OF SERVICE TO INDUSTRY
GRATON AND KNIGHT ®

Only wood that won't rot is worth building with!

For your own protection BUILD WITH Penta PROTECTED WOOD

Your wood construction lasts longer, is safer, and requires less maintenance when you build with PENTA-PROTECTED wood. Penta*, the clean wood preservative, gives wood durability, gives "built-in" protection against termites and rot. PENTA-PROTECTED wood lasts up to four times longer than unprotected wood. You'll also find that PENTA leaves wood clean, easy to work with.

Plan your wood construction to last. Use PENTA-PROTECTED wood for longer-lasting, more economical wood structures.

*Penta is a registered trademark of the chemical pentachlorophenol.

THE DOW CHEMICAL COMPANY
MIDLAND, MICHIGAN

Send for free booklet,
"Pointers on Penta"

The Dow Chemical Company
Dept. PE-14
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DOW
Penta
chlorophenol

alloy frame roller will find many other uses in the movement and positioning of pallet loads. The ten double-ball-bearing rolls are mounted tilt-fashion in the frame, permitting full 360-degree swivel rotation. Ask manufacturer for his bulletin No. 103.

Frank L. Robinson Co., 1706 Broadway, Oakland 12, Calif.

Rear-Loading Assembly Bins

Scoop openings now permit individual Stackbins to be refilled from the rear without breaking up the stacked setup or interrupting assembly work. Parts feed toward the front, eliminating fumbling and reaching. These stacking bins have locking, all-welded construction with smoooth folded edges.

Stackbin Corp., 1129 Main St., Pawtucket, R. I.

Dye House Truck

Designed primarily for textile dyeing and finishing operations, a caster-mounted Market Forge hand truck is made of stainless steel. The truck bottom is raised in the center, forcing fluids to drain out through side openings.

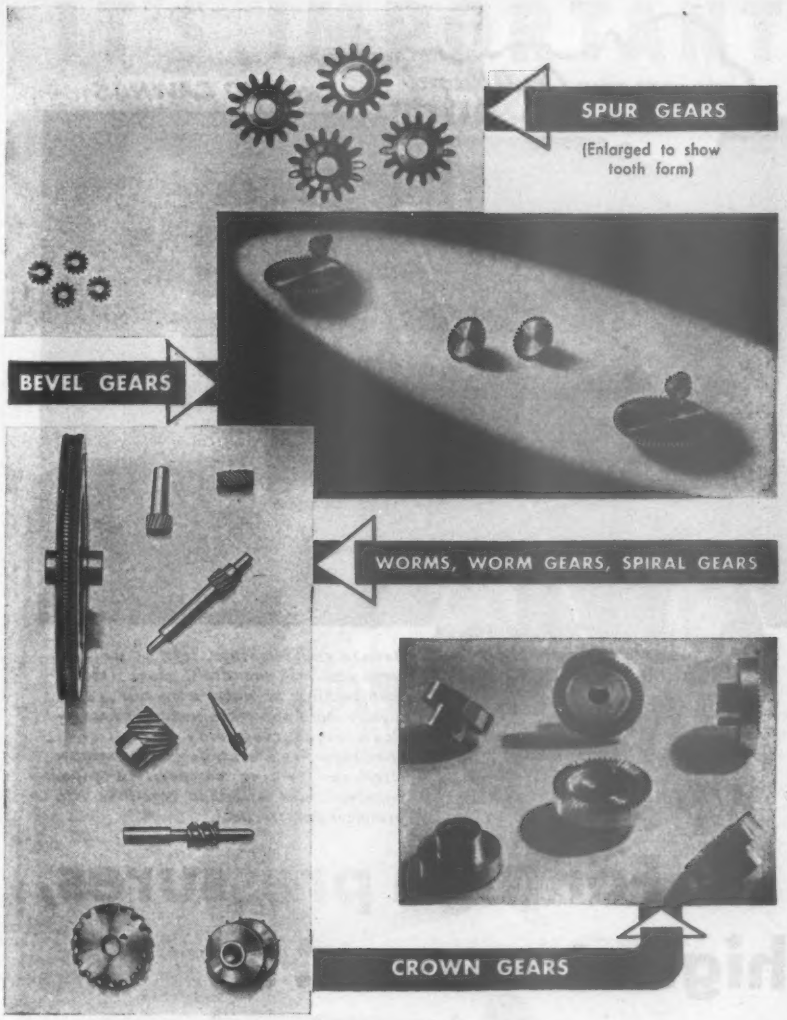
Market Forge Co., Everett, Mass.

•

SPECIAL SCREW CONVEYORS—come with dust-tight end plates. Separate dust-tight end assemblies are also available for mounting on your own standard screw conveyor. Kornylak Engineering Corp., 513 Communipaw Ave., Jersey City 4, N. J.

SNOW PLOW—for all Clark pneumatic-tired fork lift trucks of over 1000-lb. capacity, requires no tools to mount, dismount, or adjust blade. Ballast box can be filled to increase traction when the going gets rough. Blade stands 22½ inches high, weighs 400 lb. Clark Equipment Co., Industrial Truck Div., Battle Creek, Mich.

More on next page



HAMILTON No. 1 PRECISION GEAR HOBBER

(Capacity:—6" diameter of gear blank)

Install a Hamilton No. 1 Precision Gear Hobber and make your choice:—the same hourly production as formerly with far more precision, or the same precision as formerly with greatly increased production.

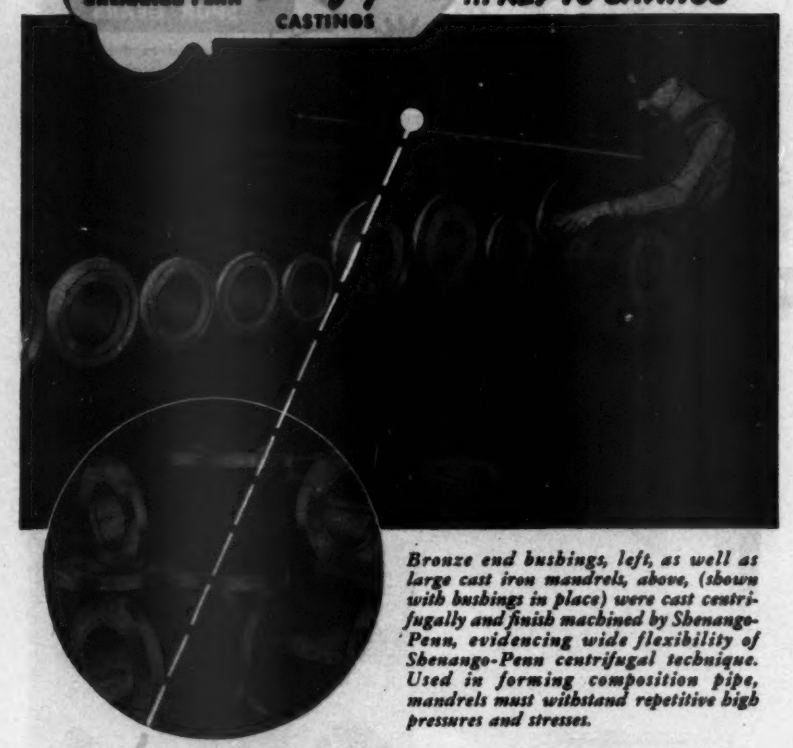
Ask for Bulletin H-1-49

THE Hamilton TOOL COMPANY

908 HANOVER STREET • HAMILTON • OHIO • U • S • A

A few DEALERSHIPS are still available.

SHENANGO-PENN Centrifugal CASTINGS ... KEY TO SAVINGS



Bronze end bushings, left, as well as large cast iron mandrels, above, (shown with bushings in place) were cast centrifugally and finish machined by Shenango-Penn, evidencing wide flexibility of Shenango-Penn centrifugal technique. Used in forming composition pipe, mandrels must withstand repetitive high pressures and stresses.

For high pressures, high stresses . . .

IF you need rolls, or *any* symmetrical or annular parts requiring unusual strength, uniformity, wear resistance or freedom from porosity and defects, check with Shenango-Penn. These very qualities are inherent in the carefully controlled Shenango-Penn *centrifugal* casting process. You stand to save time and money . . . to avoid needless trouble.

Check also on Shenango-Penn's modern machining and finishing service. It combines complete facilities and years of specialized experience to meet your specifications with over-all precision . . . another time-and-money saver!

For free descriptive bulletins, for specific data on ferrous or nonferrous work, large or small, semi or finish machined, write to . . .

SHENANGO-PENN MOLD COMPANY
2886 West Third Street Dover, Ohio
Executive Offices: Pittsburgh, Pa.

SHENANGO PENN

ALL RED BRONZES · MANGANESE BRONZES · ALUMINUM BRONZES
MONEL METAL · NI-RESIST · MEEHANITE® METAL

Begins on page 132

AIR CONDITIONING

Plug-In Humidity Controller

How about a humidity controller that requires no installation at all! The Abbeon people have one that will operate electrically powered humidifiers and dehumidifiers. You plug the humidifier into the control, and the control into an outlet. Set the desired relative humidity on the dial (graduated between 20 and 100%) and the control takes over from there.

The controller will handle a continuous load of 15 amp. at 115 volts. Humidity controller comes equipped for wall mounting.

Abbeon Supply Co., 58-10 41st Drive, Woodside, N. Y.

Plastic Air Filter

The shredded plastic filler in a new type of air filter does its job of cleaning by electrostatic attraction. The material, when exposed in a current of air, picks up an electrostatic charge, enabling it to attract and retain extremely fine dust and smoke particles. The filter is readily cleaned by immersion in a detergent solution.

The Goodyear Tire & Rubber Co., Akron, Ohio.

•

DUST COLLECTOR—with extra large storage capacity for dust, lint, shavings, etc., has been added to line of Aget-Detroit Co., Ann Arbor, Mich. Unit can handle 6 grinding wheels of 16-in. diameter; or 3 buffing wheels of 24-in. diameter.

More on next page

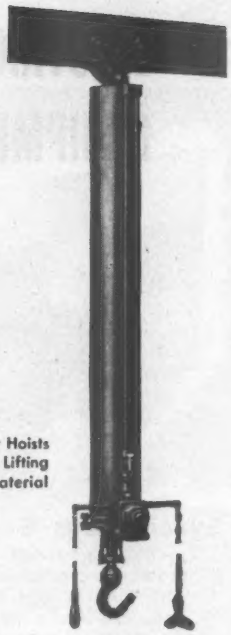
IT'S IMPORTANT

To SAVE MAN HOURS
REDUCE PRODUCTION COSTS
INCREASE PLANT EFFICIENCY

That's Why It Will Pay You to Investigate

CURTIS

AIR COMPRESSORS
AIR-OPERATED CYLINDERS & HOISTS



Curtis Vertical Air Hoists Provide Low-Cost Lifting or Lowering of Material or Machines.

Curtis Model F Air Compressors are available as either electric or gasoline motor-driven units (electric motor-driven portable or stationary). Up to 10 H.P.

Model C Water-Cooled Compressors, up to 50 H.P. Fully Enclosed — Dust and Dirt Proof — Carbon-free Valves. Timken Bearings.

Curtis Horizontal Air Cylinders for almost any Pushing, Pulling or Hoisting Operation.

I-51-1

Throughout the world, Curtis equipment has stood the test of time, because it is precision made from top quality raw materials with 97 years of "know how."

CURTIS PNEUMATIC MACHINERY DIVISION
of Curtis Manufacturing Company
1995 Kienlen Ave., St. Louis 20, Mo.

I am interested in items checked below:

☐ **AIR HOISTS**
Stroke? ☐ Capacity? ☐

☐ **AIR CYLINDERS**
Stroke? ☐ Capacity? ☐

☐ **AIR COMPRESSORS**
Capacity? ☐ Pressure? ☐
Current? ☐

Name.....

Firm.....

Street.....

City.....Zone.....State.....

Yet 30% Stronger Because Angier SNAKE TAPE *is Reinforced*

ACCEPTED for parcel post, express, full carload and truck shipments, *this "2 strips — not 6"* method of sealing saves *more* gummed tape and sealing labor. Angier Snake Tape is *reinforced* — therefore, STRONGER! Cartons sealed with only TWO strips of Snake Tape are proved *30% stronger* than cartons sealed with SIX strips of ordinary gummed tape.

Why don't *you* eliminate damage claims due to tape failure — save on tape requirements — cut sealing labor two-thirds! For full information and samples, mail coupon now!

1. Asphalt Bond Makes It Waterproofed.
2. Reinforced for Extra Strength.
3. Double Layer of Selected Kraft.
4. Best Animal Glue for Perfect Seal.

SIX WIDTHS IN 100 yd. rolls. Easily dispensed in any "cut-off" type machines.

FREE SAMPLE
25 YD. TEST ROLL

Angier
CORPORATION
Framingham 1, Mass.

Industrial Packaging Manufacturers & Engineers Since 1895
Representatives & Distributors in Principal Cities

( ) FACTS, literature, prices. ( ) FREE SAMPLE — 25 YD. test roll. ( ) DEMONSTRATION. Have representative show how Angier Reinforced SNAKE TAPE can seal our packages better — at less cost. (Attach coupon to letterhead or write name, title, address in margin below.)

Begins on page 132

ELECTRICAL EQUIPMENT

Synchronous Generators

Tri-clad high-speed synchronous generators are available in 4 basic designs with ratings from 1.875 to 50 kva. The basic 60-cycle design is an externally regulated generator designed to operate with standard voltage regulator in the exciter field circuit. Excitation voltage is 64 volts, with special equipment suitable for 125-volt excitation available. Ratings vary from 2 kw. single-phase to 15 kw. 3-phase.

Two other models are variations of the basic 60-cycle design. One has a self-regulation feature for use where average voltage regulation and motor starting ability are desired. The other has a special overhung amplidyne exciter and static voltage regulator, all wrapped up in one package. This latter unit fits in where close regulation and excellent motor starting ability are required.

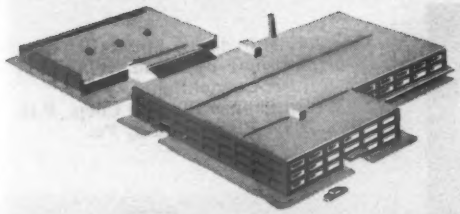
A 400-cycle, 14-pole generator completes the line. Ratings range from 2 kw. single-phase to 40 kw. 3-phase at 3428 rpm. Write manufacturer for more detailed data.

General Electric Co., Schenectady 5, N. Y.

Motor Starter

Labeled the Motor Watchman, this Westinghouse unit starts, stops, and provides overload protection for single-phase, polyphase, and d.c. motors. Ratings range up to 600 volts, 7½ hp. polyphase, 5 hp. single phase; or 220 volts, 1½ hp. d.c.

Safety features include self-indicating handle, interlocked cover, and safety latch that locks starter "off" during servicing. Overload



WORLD'S LARGEST CLEANING RESEARCH LABORATORY SOLVES YOUR CLEANING PROBLEMS . . .

Cuts cleaning costs by saving time

Check total costs at the end of one year—you'll find you pay much less for Holcomb materials than for other cleaning products.

The reason: Holcomb builds materials that reduce the time cost—which is 95% of your cleaning dollar. Holcomb products save steps, save labor, last longer. Holcomb waxes do not chip, wash off or discolor—your floors need rewaxing less frequently. Holcomb brushes and cleaning equipment are expressly designed to cut cleaning time. And Holcomb soaps and cleaners go farther—much farther.

It will pay you to standardize with Holcomb—your one source, your dependable source, for scientific cleaning materials.

★ ★ ★

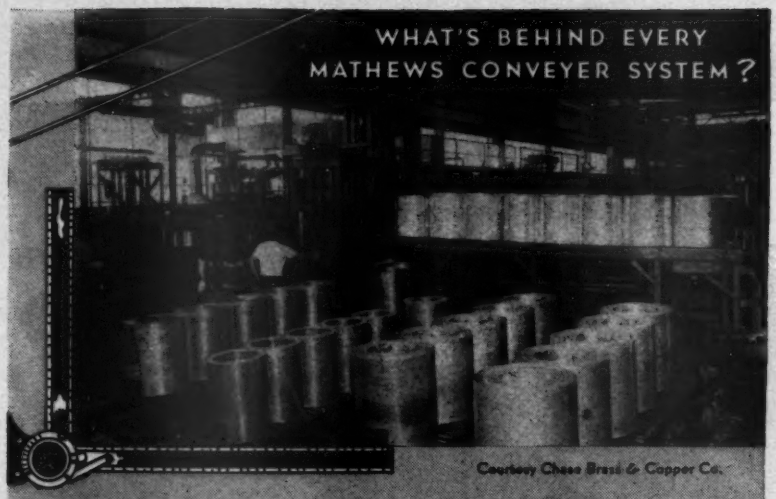
RESEARCH LABORATORY AND FACTORY, INDIANAPOLIS 7
BRANCHES IN NEW YORK AND LOS ANGELES

Call a *Cleaning Engineer*

Your nearby Holcomb Serviceman will come into your plant, make a complete cleaning survey, give you the best recommendations for walls, floors, ceilings, machinery throughout your plant. No obligation, of course.

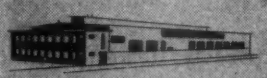
J. I. HOLCOMB
MANUFACTURING COMPANY

Scientific cleaning materials



Courtesy Chase Brass & Copper Co.

3 WELL-EQUIPPED PLANTS



● Modern, up-to-the-minute facilities are essential in the production of quality conveying equipment, and in giving efficient, complete conveyer service. That's why there are three Mathews Plants, each well-equipped and strategically located. These modern facilities, combined with skilled production forces and many years of experience in engineering and manufacturing conveying equipment, are today available to industry everywhere. Engineering offices or sales agencies are located in principal cities in the United States and Canada. And when you're thinking about buying conveyers, here's something you can be sure about. If it's Mathews equipment, it has to be right.

MATHEWS CONVEYERS

GENERAL OFFICES . . . . . *Mathews Conveyer Company*
ELLWOOD CITY, PENNSYLVANIA

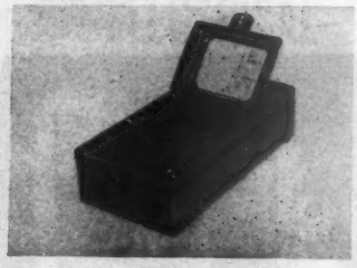
PACIFIC COAST DIVISION . . *Mathews Conveyer Company West Coast*
SAN CARLOS, CALIFORNIA

CANADIAN DIVISION . . . . . *Mathews Conveyer Company, Ltd.*
PORT HOPE, ONTARIO

Engineering Offices or Sales Agencies in Principal American and Canadian Cities

protection includes bimetallic disc-type thermal overload relay and De-ion arc-quenching.

Westinghouse Electric Corp., P.O. Box 2099, Pittsburgh 3, Pa.



Receptacle-Circuit Breaker Combination

A special-purpose unit contains magnetic circuit breakers as well as receptacles in one compact enclosure. Receptacles come wired-in. The only connections necessary are those directly to the line.

The unit is ideal for construction work and other outdoor jobs where portable tools are used. Temporary circuits can be established without makeshift arrangements merely by plugging the equipment into convenient outlets.

Enclosures come with one to four fully magnetic breakers in combination with one or two receptacles. Ratings range up to 50 amp. each. Housings of corrosion-resistant steel can be padlocked. Maker will send Bulletin EB 2013 on request.

Heinemann Electric Co., Trenton, N. J.

•

STORAGE BATTERIES—in the Yardney silver-cell line grow smaller and smaller. Latest Lilliputian—one-fourth the weight and one-third the volume of standard lead-acid batteries of similar capacity—discharges at 5 amp. up to 60 min. Yardney Electric Corp., 105 Chambers St., New York 7.

SQUIRREL CAGE MOTORS—totally enclosed, nonventilated, extend the type QZE line of Fairbanks, Morse & Co., 600 S. Michigan Ave., Chicago 5. Continuous duty ratings built in NEMA standard frame 284 are 7½ hp., 1800 rpm. and 5 hp., 1200 rpm.

SEALED TUMBLER SWITCH—in adjustable flush mounting, explosion-proof enclosure satisfies Class 1, Groups C and D classifications. Available in single- and double-pole, three- and four-way models from Russell & Stoll Co., Inc., 125 Barclay St., New York 7.

More on next page

New Spring Mechanism for Air Breakers Provides Safe Manually-Operated Switchgear

Manual closing is ideal for primary service circuit breakers serving office buildings, stores or small industrial users where operation is infrequent and electric closing power is not available.

The new Westinghouse spring-operated mechanism for hand-closing type DH "De-ion"® Air Circuit Breakers makes manual operation safe. This spring-operated closing mechanism is loaded by hand through a mechanical linkage. When the compressed spring is released by means of the pushbutton, it closes the breaker with sufficient speed and force to overcome magnetic effects of short-circuit currents.

The breaker can be closed and tripped with the housing door closed. At the same time, the operator has a visual indication of the breaker status. Your maintenance men can also close and open the breaker slowly by hand for inspection purposes. The control post can be lowered to permit installation or removal of the main barrier, or raised to permit the housing door to be closed with breaker in test position.

The spring-closed DH Air Breaker is supplied with a metal-clad switchgear housing of standard dimensions and having a panel suitable to its application.

This new mechanism is designed for a maximum breaker momentary current rating of 60,000 amperes. For complete details, see your nearest Westinghouse representative or write Westinghouse Electric Corporation, P. O. Box 868, Pittsburgh 30, Pennsylvania.

★ ★ ★

See "Electrical Proving Ground" . . . the dramatic story of the Westinghouse High-Power Laboratory, in sound and color motion picture. For details, write Westinghouse Film Division, Box 868, Pittsburgh 30, Pennsylvania. J-60746

you can be SURE ... if it's Westinghouse

METAL-CLAD SWITCHGEAR

This man...

BRINGS YOUR WORLD TO YOUR DOOR!

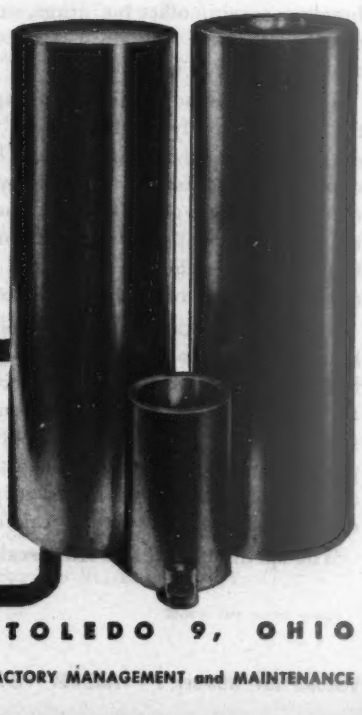
Three billion dollars worth of industrial equipment, tools, and supplies is quite an order even today. Yet there is a man in these United States who alone supplies to you and other customers approximately three billion dollars worth of such commodities every year.

Consider what it would cost in time, trouble and money every year for you and other manufacturers to find and bring to your plants this enormous quantity of things you use in your business.

Serviceable

"This man" is an industrial distributor or a specialist in certain industrial items. You will find him listed in the classified section of your telephone book—most likely under the heading Bars, bronze or Bearings, bronze. If he is the leading distributor, he almost certainly is the Bunting Distributor. He carries in stock for your money saving convenience Bunting Standard Stock Industrial Bearings, Electric Motor Bearings, and Precision Bronze Bars—ask him for catalog.

There are approximately 2,000 Industrial Distributors serving every industrial section of the United States. In 1948, their total sales were more than $3,000,000,000. They carry an average inventory investment of $500,000,000, turn their stocks over 5 to 6 times per year, fill 200,000 orders per day, have 12,000 outside salesmen and engineers, 10,000 inside telephone order expeditors, operate 8,000 trucks delivering merchandise on which their average net profit is .0292 cents per dollar of sales.



Bunting®

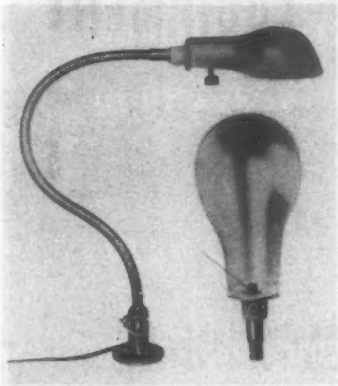
BRONZE BEARINGS • BUSHINGS • PRECISION BRONZE BARS

THE BUNTING BRASS & BRONZE CO., TOLEDO 9, OHIO

WHAT'S NEW IN EQUIPMENT

Begins on page 132

LIGHTING



Flexible Bench Light

The tubing on the Porta-Flex bench light is said to be made from a special steel that retains its flexibility throughout continued usage. Another feature has the shade attached directly to the tubing. The lamp socket is screwed into a nipple pressed onto the end of the tubing—eliminating wear on socket and shade. Standard shade houses 75-watt lamp—100-watt shade is optional.

Gardner Products Co., 13196 Turner Ave., Detroit 4, Mich.

Slide Hanger for Fluorescent Fixtures

Sylvania has introduced a "Quick Grip" slide hanger said to permit speedy one-man installation of its line of Trimline lighting fixtures. Flexibility of installation is provided, since the hangers will support the fixture at almost any convenient position on the ceiling.

After the hanger is fastened on a stem or directly to the ceiling, the fixture is brought up into the slide grip which holds it firmly in place. The tightening of a setscrew completes the installation.

Sylvania Electric Products, Inc., 1740 Broadway, New York 19.

•

MACHINE LIGHTS—in two models — one with adjustable tension joints, the other with flexible tubing—comprise the new line of Fostoria Pressed Steel Corp., Fostoria, Ohio. Bulletin on Localites available on request.

More on next page

"Automatic" AER-O-FOAM FOR INDUSTRY

Considered to be one of the foremost recent advancements in the science of fire protection, "Automatic" AER-O-FOAM has opened new avenues in fire safety which heretofore were not thought to be practical or economically feasible. Hazardous conditions familiar to chemical processing industries, metal working plants, petroleum storage and handling, electric power generation, and other occupancies where flammable liquids are involved, can now be fully safeguarded by engineered "Automatic" AER-O-FOAM protection.

A hydrolyzed protein, manufactured from a soya bean base, AER-O-FOAM when mixed with water and aerated, forms a smothering tenacious blanket capable of flowing around obstacles. The system is set into operation "Automatically" through the quick response of highly sensitive Rate-of-temperature-Rise heat detectors and allows for the speedy extinguishment of fires involving gasoline, benzol, naphtha, and many other flammable liquids.

This form of protection also provides important engineering advantages evidenced in the improvement of drainage conditions, reduction of water supply requirements, non-corrosive action of the foam material and prevention of re-flash. As "Automatic" AER-O-FOAM dehydrates rapidly following application, clean-up operations are practically non-existent.

Better investigate the advantages of "Automatic" AER-O-FOAM protection for those stubborn fire areas in your plant. More detailed information is available through your nearest "Automatic" Sprinkler representative. He'll be happy to furnish you with surveys and estimates without cost or obligation. Write or call today.

"AUTOMATIC" SPRINKLER CORPORATION OF AMERICA
YOUNGSTOWN 1, OHIO

"Automatic" Sprinkler
FIRST IN FIRE PROTECTION

DEVELOPMENT . ENGINEERING MANUFACTURE . INSTALLATION
OFFICES IN PRINCIPAL CITIES OF NORTH AND SOUTH AMERICA

Telescribers can help you beat shortages

Faced with the shortages that occur when industry mobilizes to meet a national emergency, manufacturers once again must fully utilize all their available manpower and material.

Full utilization rests on the ability of the manufacturer to maintain absolute control over production, quality and material. This can only be done effectively where rapid, accurate intra- and inter-plant communication exists. Your plant can benefit by such communication through TelAutograph Telescriber Service.

TelAutograph telescribers transmit messages (in the sender's own handwriting) over wire *instantly* to one or many outlying points. No time is wasted waiting for contact. The telescriber receiver displays the written message until it is noted and removed. No costly delays result from misunderstood orders. It serves as a permanent record of the communication.

To find out how TelAutograph telescribers can save time, material and money in your plant operation, write Dept. B-2.

TelAutograph CORPORATION

16 West 61st Street
New York 23, N. Y.

Telescribers by TelAutograph

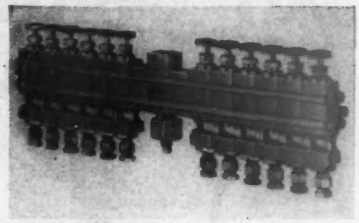
When writing for information, ask for details on the newest telescriber feature—simulated forms on your plant's telescriber transceivers.

"Handwritten Messages Deliver Themselves While You Write"

WHAT'S NEW IN EQUIPMENT

Begins on page 132

LUBRICATION EQUIPMENT



Angle Sight Oil Feed Valves

These angle sight feed valves provide close regulation and a visual check of oil flowing in pressure or gravity lubrication systems. Units can be used singly or gang-mounted as shown above.

Single valves have needle valve control to regulate oil from full flow to complete shutoff. A friction screw affords hairline adjustments. Sight chamber with unbreakable plastic or glass sight is vented to prevent air binding. Valves are machined from bar stock in three body sizes, with inlet of ⅛- to ¼-in. female pipe thread, and outlet of ⅛- to ½-in. female pipe thread or compression fitting.

Gang-mounted systems with from 2 to 24 valves permit multiple oiling controlled from one central point. The oil fed to each bearing can be individually adjusted and observed at one station.

Oil-Rite Corp., South 13th St., Milwaukee 15, Wis.

Gravity Feed Oiler

You can use the new economy-size Trico gravity-feed oiler wherever a large quantity of oil is desired, or when it is desirable to extend reservoir refilling time as long as possible. Extra large capacities up to 2½ quarts are available in glass or plastic reservoirs.

Rate of feed is determined by needle valve control. Shutoff lever at top starts and stops flow. Available with standard threads for mounting directly on top of bearing, or with compression fitting for connection to copper or Neoprene tubing.

Trico Fuse Mfg. Co., 2948 N. 5th St., Milwaukee 12, Wis.

More on next page

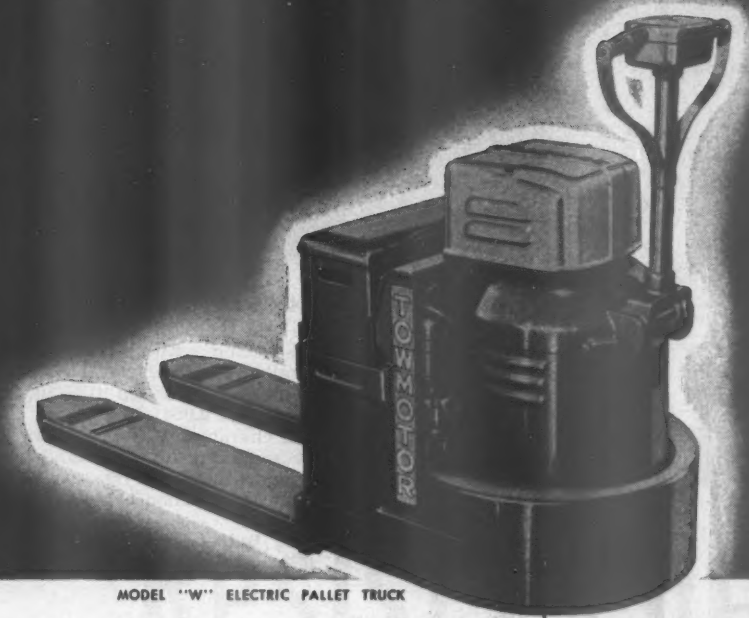
fast, agile, highly maneuverable · outstanding design

compact, rugged construction · touch-button control

transports 4,000-lb. loads · smooth hydraulic lift

positive-action brake · raises heavy loads rapidly

dual rubber trailer wheels · powerful electric drive



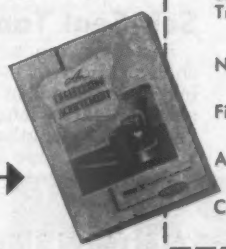
MODEL "W" ELECTRIC PALLET TRUCK

See the
TOWMOTOR EXHIBIT
BOOTHS 322-323
1951 MATERIALS HANDLING EXHIBITION
International Amphitheatre
Chicago, April 30—May 4

TOWMOTOR GIVES YOU

more features

Any way you look at it, the Towmotor Model "W" Electric Pallet Truck is an engineering achievement packed with cost-cutting features for fast, safe, easy handling of loads up to two tons. Its great versatility is being proved in every type of manufacturing. Learn how this efficient electric truck can help cut *your* handling costs. Write for the comprehensive booklet shown in coupon.



SEND FOR NEW BOOKLET

TOWMOTOR
THE ONE-MAN-GANG®

FORK LIFT TRUCKS and TRACTORS
RECEIVING • PROCESSING • STORAGE • DISTRIBUTION

TOWMOTOR CORPORATION, Division 5
1226 E. 152nd Street, Cleveland 10, Ohio

Please send the new free booklet, "AN ENGINEERING ACHIEVEMENT," giving complete cost-saving details of the Model "W" Electric Pallet Truck.

Name_____ Title_____

Firm_____

Address_____

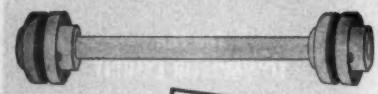
City_____ State_____

THOMAS
Flexible ALL METAL
COUPLINGS
FOR POWER TRANSMISSION
REQUIRE NO MAINTENANCE

Patented Flexible Disc Rings of special steel transmit the power and provide for misalignment and end float.

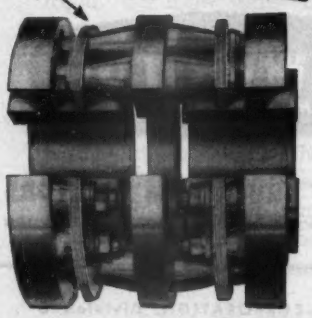
Thomas Couplings have a wide range of speeds, horsepower and shaft sizes:
½ to 40,000 HP
1 to 30,000 RPM

Specialists on Couplings for more than 30 years



BACKLASH
FRICTION
WEAR and
CROSS-PULL
are eliminated
Lubrication is not required!

PATENTED FLEXIBLE DISCS



THE THOMAS PRINCIPLE GUARANTEES PERFECT BALANCE UNDER ALL CONDITIONS OF MISALIGNMENT.

NO MAINTENANCE PROBLEMS.

ALL PARTS ARE SOLIDLY BOLTED TOGETHER.

Write for the latest reprint of our Engineering Catalog.

THOMAS FLEXIBLE COUPLING CO.
WARREN, PENNSYLVANIA

MAINTENANCE TOOLS & SUPPLIES

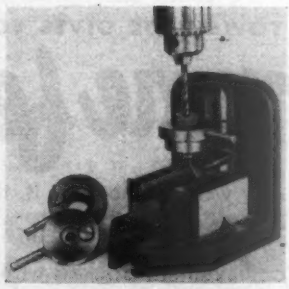
Chrome Plating Process for Wear Parts

A little chrome plate here and there in the right place may lengthen the life of wear parts and cutting tools many times over. In the Chromaster Model A-20 you can have complete portable facilities for plating metal surfaces up to 10 sq. in., with control of plate thickness to within 0.0001 in.

Features are the non-critical character of the solution, positive uniformity of plate, and elimination of buildup. The Ward Leonard people claim that your maintenance men can be chrome plating dollar savings into your maintenance budget with only a few hours' instruction.

Ward Leonard Electric Co., Industrial Chrome Div., Mount Vernon, N. Y.

Small-Lot Drill Jig



The Mathewson adjustable drill jig brings mass-production economy to many typical small-lot maintenance jobs. It will help you cut layout and drilling time on holes for cotter pins and set screws, oil holes in tubular sections, and wiring holes in cap screws.

Hole diameters range from 1/16 to 1/2 in., using standard slip bushings. Hardened V-block has 90-degree V on one face for round stock, 60-deg. V on the opposite face for hex stock. Adjustable stops locate work longitudinally.

Mathewson Machine Works, Inc., 2 Hancock St., North Quincy 71, Mass.

Self-Seal Tank Stud

Fastening brackets or cover plates to liquid containers is child's play with the Self-Seal stud. This tank stud has self-sealing pipe thread on one end, standard screw thread on the remainder of its length. The hollow head takes a hex wrench. Available in lengths up to 3 inches with various combinations of standard and pipe threads.

Donear Products Co., 1523 Huffman Blvd., Rockford, Ill.

More on next page

NEW Easy to Clean Resists Corrosion

CORROSIVE ATMOSPHERES CAN'T HURT this Allis-Chalmers totally enclosed, fan-cooled motor because major parts are enclosed in a rigid corrosion resistant cast iron frame! No extra treatment is needed and cast iron's corrosion resistance won't chip off.

Lower Maintenance, Too

No corners, pockets or hidden air passages to collect dirt. Cleaning is the simplest of maintenance operations. Just blow off the dirt with an air hose. Fan and housing design keep cooling airflow tight against the yoke so dirt does not accumulate and cleaning is seldom required.

Factory Lubricated Bearings

Bearings are lubricated at the factory and operate without attention or cost for years. Extra rigidity of the cast iron frame holds bearings in true alignment under all operating conditions. This gives long bearing life and low operating costs.

Get All The Facts

The new *Safety Circle* totally-enclosed fan-cooled motor is built in all NEMA standard frame sizes from 224 to 505. Call your nearest Allis-Chalmers Authorized Dealer or Sales Office for complete information or write Allis-Chalmers, Milwaukee 1, Wisconsin. Ask for Bulletin 51B6144. A-3228

Safety Circle, *Texrope* and *Vari-Pitch* are Allis-Chalmers trademarks.

Sold . . .
Applied . . .
Serviced . . .

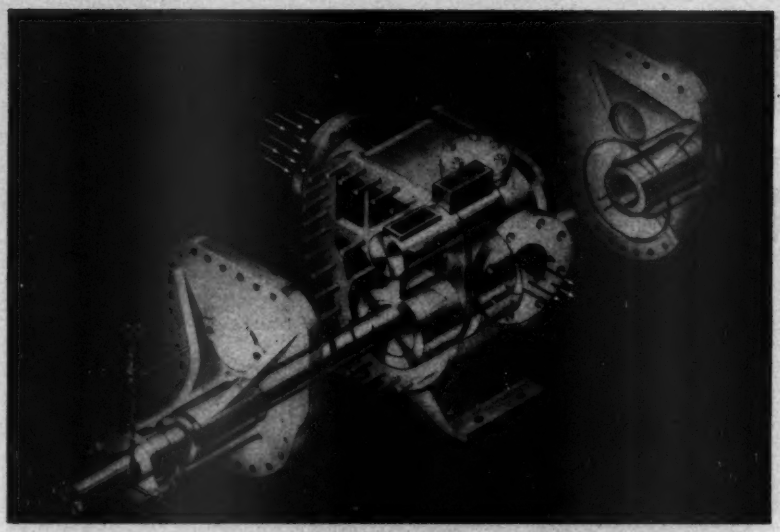
by Allis-Chalmers Authorized Dealers, Certified Service Shops and Sales Offices throughout the country.

CONTROL — Manual, magnetic and combination starters; push button stations and components for complete control systems.

TEXROPE — Belts in all sizes and sections, standard and *Vari-Pitch* sheaves, speed changers.

PUMPS — Integral motor and coupled types from ¾ in. to 72 in. discharge and up.

ALLIS-CHALMERS



WHAT CAN THIS PUMP MEAN TO YOU?

To the sugar refiner it means smooth, non-foaming pumping of even the most viscous syrups and gassy molasses. To the oil refinery operator it means high-efficiency pumping of asphalt, lube oils, greases, emulsions, etc. To the processor of foods and edible oils it means competent handling of everything from chocolate to lard, from fish oil to fig newton paste!

Yes, this unique pumping mechanism means many things to many different industries. It's the *Kinney SD Rotating Plunger Pump* . . . a pump that can mean important production and processing advantages to you. Perhaps some of your raw materials or products now being handled as solids can be pumped by an SD Pump. Perhaps you need a positive displacement unit that will pump liquids with meter-like volumetric accuracy. Perhaps you require the extremely high vacuum characteristics of this positive displacement unit.

Whatever your pumping problems, Kinney Engineers are ready to help you find the right pump for your needs. Send coupon below, or write giving complete details. Kinney Manufacturing Co., 3624 Washington St., Boston 30, Mass. Representatives in New York, Chicago, Cleveland, Houston, New Orleans, Philadelphia, Los Angeles, San Francisco, Seattle, and foreign countries.

Kinney
LIQUID PUMPS

KINNEY MFG. COMPANY
3624 WASHINGTON ST., BOSTON 30, MASS.

Gentlemen: Please send me Bulletin L48 . . . the complete catalog of Kinney Liquid Pumps. My liquid pumping problem involves:

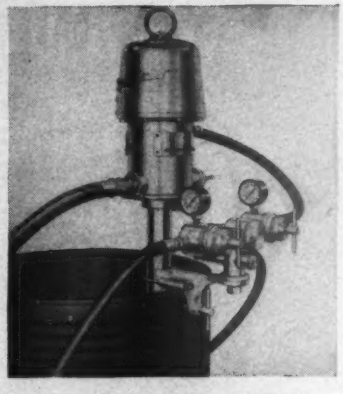
☐ Acid Sludge ☐ Asphalt ☐ Chocolate ☐ Crude Oil
☐ Lube, Diesel Oil, etc. ☐ Edible Oils ☐ Fuel Oils ☐ Grease
☐ Molasses ☐ Paint, Enamel ☐ Road Oil ☐ Soap, Glycerine
☐ Tar ☐ White Lead ☐ Others (see letter attached)

Name..... Company.....

Address.....

NEW MAINTENANCE TOOLS & SUPPLIES

Begins on page 152

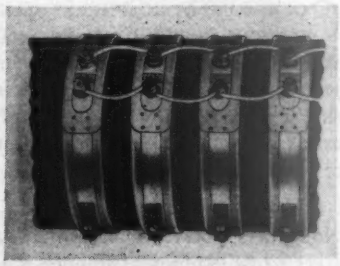


Spray Gun Pump With Anti-Spurt Device

Spray guns often spurt when spraying heavy industrial materials. But, according to the manufacturers, spray guns working from the Mogul-Type Powerflo Pump won't. A device, called Evenflo, positively prevents spurting, and insures a smooth, even coating.

Mogul Pumps—operating in original 400- or 100-lb. drums, or in bucket-type containers—supply industrial materials through hoses for spray, pole, or extrusion gun application. Working on air pressures from 20 to 175 psi., they will handle rust and corrosion preventives, calking compounds, adhesives, undercoaters, and other industrial fluids and semi-fluids.

Gray Co., Inc., Industrial Div., Graco Sq., Minneapolis 13, Minn.



Narrow Band Heaters

Watlow's new narrow band electric heating units are said to achieve a higher heat concentration—over 40 watts per sq. in.—without a simultaneous shortening of their life span. Flexibility is added by using a group of these narrow units for one heating job, since only a fractional wattage loss results if one burns out. A metal clamping band that covers a great-

For Your NORMAL *Needs*

LYON offers more than 1500 regularly cataloged items of steel equipment engineered to meet your civilian or defense production needs. See list below.

For DEFENSE *Sub-Contracts*

Complete sheet metal facilities to handle gauges 10 to 24. Two strategically located plants, 1500 trained workers, our own toolrooms, 3800 contracts in World War II.

2 STRATEGIC PLANTS . . . AURORA, ILL., AND YORK, PA.

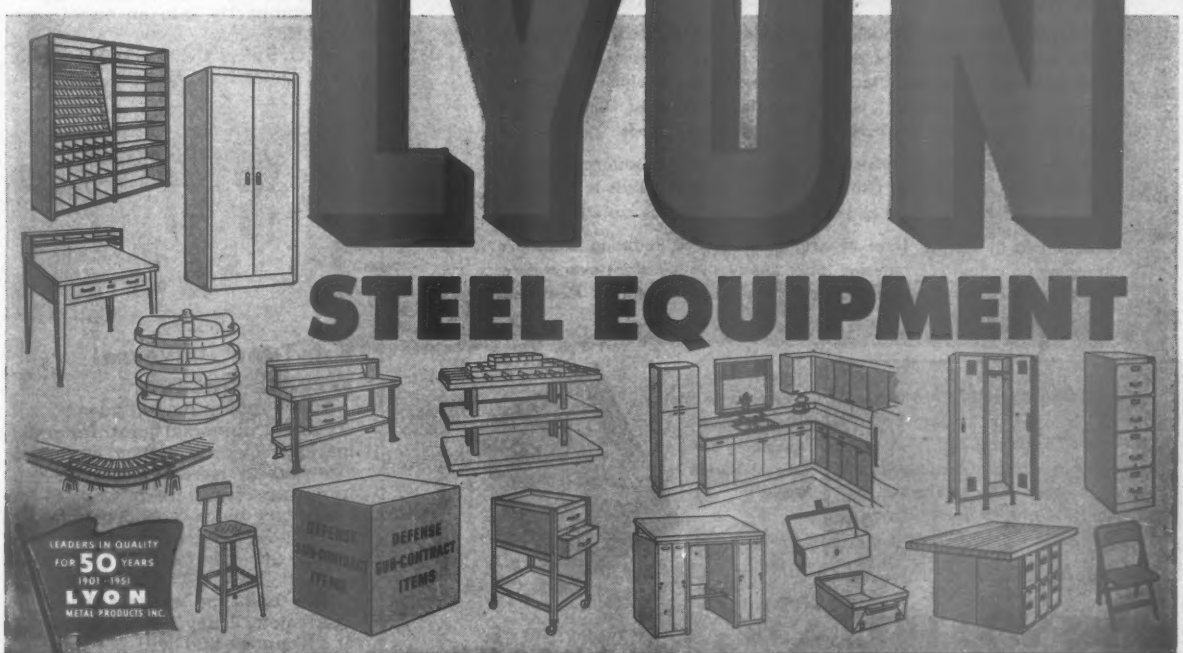
LYON METAL PRODUCTS, INCORPORATED

General Offices: 212 Monroe Avenue, Aurora, Illinois

Sold Nationally through Factory Branches and Dealers

LYON

STEEL EQUIPMENT



A PARTIAL LIST OF LYON PRODUCTS

• Shelving	• Kitchen Cabinets	• Conveyors	• Economy Locker Racks	• Display Equipment	• Filing Cabinets	• Service Carts	• Tool Stands
• Lockers	• Cabinet Benches	• Bar Racks	• Flat Drawer Files	• Drawing Tables	• Folding Chairs	• Sorting Files	• Shop Boxes
• Stools	• Storage Cabinets	• Tool Boxes	• Toolroom Equipment	• Revolving Bins	• Wo Benches	• Drawer Units	• Tool Trays
• Bin Units	• Welding Benches	• Parts Cases	• Wood Working Benches	• Hanging Cabinets	• Bench Drawers	• Hopper Bins	• Shop Desks

Make Daylight Hours More Profitable with . . .

GLARE REDUCING

COOLITE GLASS

Glare Reducing Coolite Glass installed in plant of American Box Board Company
Vern E. Alden, Architect
Clearing Industrial District, General Contractor

Blinding sun rays that cause eye fatigue and lead to inefficiency and production declines are turned aside or absorbed by Glare Reducing COOLITE Glass.

Of a cool, blue color with slightly greenish cast, COOLITE admits only softly diffused, comfortable daylight . . . reduces transmission of solar heat radiation and lightens load on air conditioning equipment. Temperatures inside are reduced . . . working conditions improved. Eliminated are painted windows, makeshift shields and bothersome blinds.

Used either in new construction or in modernization and sash replacement projects, the installation of Glare Reducing COOLITE Glass is an investment in greater production and decreased maintenance costs.

Installations of Coolite, Heat Absorbing and Glare Reducing Glass are stepping up output . . . reducing labor turnover in industries everywhere. For money-saving details, consult your nearby distributor of Mississippi Glass. See him today.

Rolled, Figured and Wired Glass by Mississippi is *"Visioneered"* for better daylight illumination. There is a pattern and surface finish scientifically designed to distribute light to best advantage in your plant.

Send for new catalog, "Coolite, Heat Absorbing and Glare Reducing Glass."

MISSISSIPPI Glass COMPANY

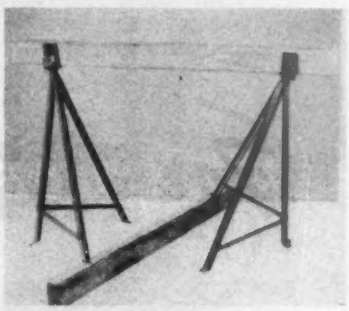
SAINT LOUIS 7, MO.

NEW YORK • CHICAGO • FULLERTON, CAL.

WORLD'S LARGEST MANUFACTURER OF ROLLED, FIGURED AND WIRED GLASS

er portion of the internal winding is said to provide excellent contact between heating unit and cylinder to be heated.

Watlow Electric Mfg. Co., 1320 N. 23rd St., St. Louis.
6 M

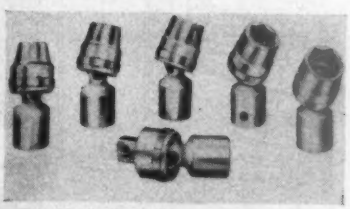


Adjustable 3-Legged Support

Want to make a saw horse or table top set evenly, without wobbling, on rough and irregular floor surfaces? If so, try the Sweet 3-legged support.

Each of the three feet rests independently on the ground, safely adjusting to any irregularity or slope up to 2 inches. Designed with adjustable knee-action in the headpiece, they can be used in pairs with a rail or bar to set up a horse, or in fours to form the sturdy legs for temporary benches and tables. The steel angle legs of each support fold compactly into an easy-to-carry unit.

H. C. Sweet Co., 12083 Woodbine Ave., Detroit 28, Mich.



Ball-Type Universal Wrench Sockets

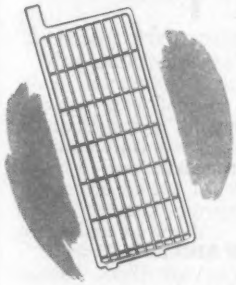
Five Proto universal power sockets and a universal joint, for pneumatic or electric impact wrenches, are said to have a ball-type coupling superior in many ways to the customary block-type. They are designed for wrenches with ½-in. square drive, but can be adapted to ⅝- and ¾-in. drive wrenches.

The ball-type sockets have no dead spots. They operate smoothly at all angles and will not back off work as force is evenly and constantly applied. Maker claims ball design is stronger and will stand up under more abuse. Sockets have

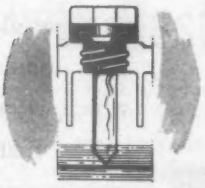
GOULD-POWERED TRUCKS!

Keep Production Rolling!

Here's why. Battery trucks are always ready to work . . . position loads faster . . . cut accidents . . . are quiet and odorless . . . are safe with foods and inflammables . . . hug the floor on turns and high lifts . . . reduce operator fatigue.



Gould's "Z" Grid is completely solid all the way through. Porosity reduced 85%! 66% more resistant.



Gould batteries with Televel Vents save time and trouble— show electrolyte level without removal of Vent Caps.

Regenerative active material that renews itself continuously is held in place to do useful work by exclusive glass tape insulation.

Power your trucks with

GOULD "THIRTY" BATTERIES

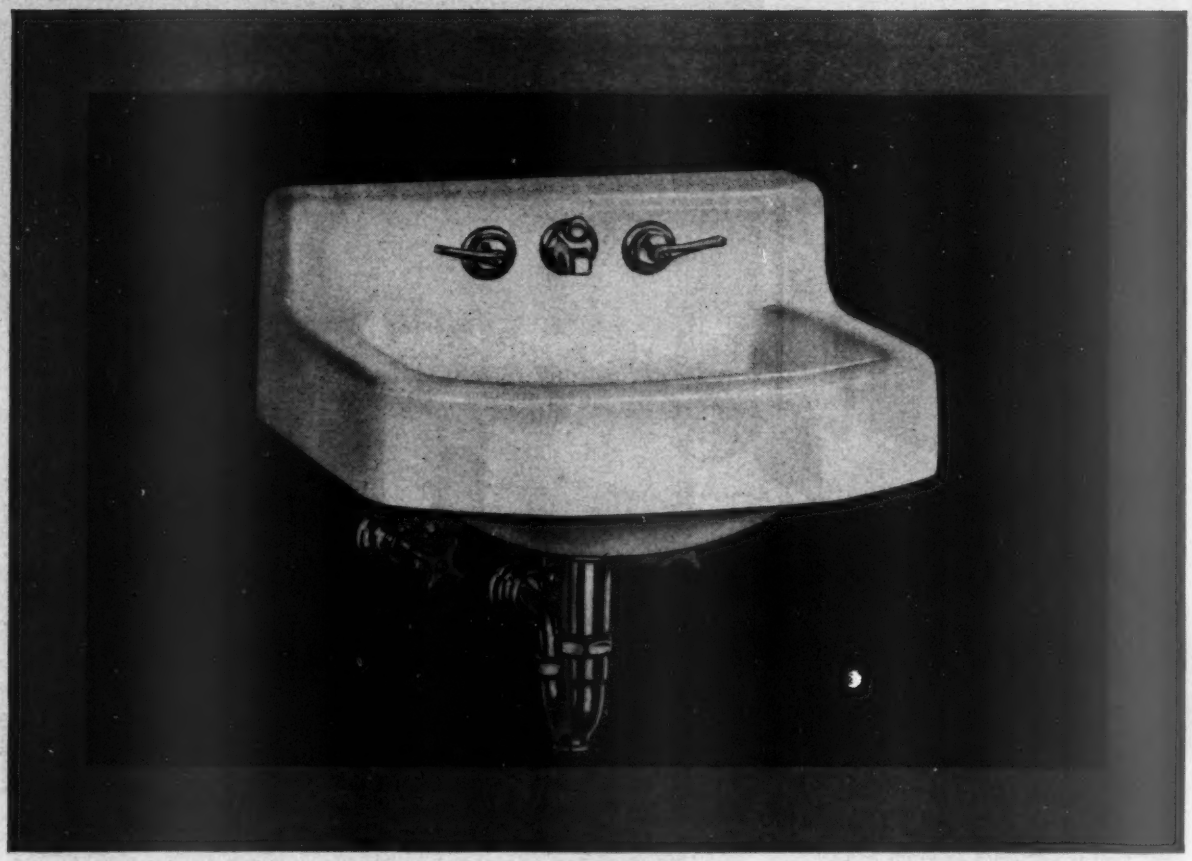
America's Finest Industrial Truck Batteries

GOULD

STORAGE BATTERIES

GOULD-NATIONAL BATTERIES, INC.

TRENTON 7, NEW JERSEY



K-2700-A. *19 x 17", 22 x 19". Latter with built-in soap dishes.*

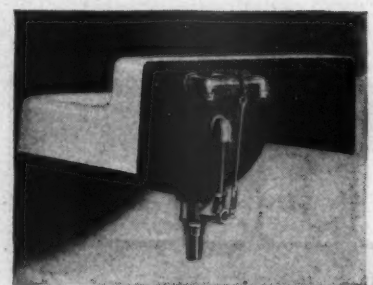
HAMPTON LAVATORY

without overflow

The popular Hampton enameled iron lavatory is now available without overflow—an innovation which is receiving wide acceptance.

The Hampton is extensively used in homes and apartments, factories, schools, hospitals, hotels and institutions. Practical features include the unobstructed shelf across the back, ample basin, compact mixer fitting with Synchro pop-up drain. The lustrous, easy-to-clean Kohler enamel is fused to non-flexing iron, cast for rigidity. Fittings are of durable brass, chromium-plated.

Kohler Co., Kohler, Wisconsin. Established 1873.



The Hampton is also offered with a brass overflow. **(K-2701-A).**

KOHLER OF KOHLER

PLUMBING FIXTURES • HEATING EQUIPMENT • ELECTRIC PLANTS • AIR-COOLED ENGINES • PRECISION PARTS

½-, 9/16-, ⅝-, 11/16-, and ¾-in. hexagon openings.

Plomb Tool Co., 2209 Santa Fe Ave., Los Angeles 54.

Acetylene-Air Torch

Built-in pilot light, diaphragm-type valve, and lightweight plastic handle make the Sod-R-Braze acetylene-air torch easy to use. Valve is so designed and positioned that the operator can turn the torch on and off, adjust the flame, and regulate the pilot light, all with the thumb of the hand holding the torch.

Six tips, with individual mixers, ranging from 3/32- to ¼-in. diameter permit a range of work from soldering fine parts to sweat fitting and heavy heating. A refrigerant leak detector, which attaches to the torch handle, can be used for locating leaks of halogen and other refrigerant gases.

National Cylinder Gas Co., 840 N. Michigan Ave., Chicago 11.

Scaling Hammer

The multipoint hammering surface helps the Jack Churchward scaling tool loosen scale quickly and efficiently. The top of the head is hollow ground for scraping weld spatter, and the parrot-beak pick comes in handy for removing slag from pockets, corners, and along the edges of welds.

Jack Churchward Welding Accessories, North Haven, Conn.

Boring Tools

Improved features on the new line of E-Z Set boring tools include (1) larger dovetail areas for increased tool rigidity, (2) ground-fit male and female dove-tail, (3) micrometer adjustment accurate to within 0.0002 inches, and (4) elimination of distorting slots or gibs.

Interchangeable shanks make the set universally adaptable for use in any jig borer, milling machine, boring mill, etc., Chrome-nickel-molybdenum and nickel-molybdenum alloy boring tools are available in three models with ½-, 1-, and 1½-in. maximum boring bar

"FASTER, CHEAPER and less likely to split wood than tacks," reports manufacturer of wooden toys. Bostitch motor-operated tacker — shown fastening toy parts — is also used for tacking boxes, signs, many other things. Adjustable table permits tacking objects up to 31" in height.

DOUBLE DUTY. Bostitch blade type stapler fastens frames for drum majorettes' shakos and, because of its thin blade, is also used in assembling "mortar boards" for graduation costumes, speeding output, cutting costs.

LESS OVERLAP is needed and FASTER, BETTER FASTENING results when Bostitch gooseneck stapler is used to fasten conical party hats. Staples are placed parallel to seam. Also saves time and costs fastening cylindrically shaped objects.

How Much Could YOU Cut Costs with Bostitch?

If you are not already using Bostitch stapling machines on your fastening operations, why not investigate now? You may find you can get more work done in less time with Bostitch foot- and motor-operated staplers like the ones shown in use here, or with other models among the 800 varieties of Bostitch staplers, hammers, tackers, and wire stitchers. For complete details, mail coupon below today.

PLEASE ATTACH THIS COUPON TO YOUR LETTERHEAD

BOSTITCH, 406 Mechanic Street, Westerly, R. I.

My problem involves fastening .....

to..... I now use .....

Please send me literature describing the Bostitch machines you believe will help me cut my fastening costs.

Name..... Title.....

Firm.....

Street.....

City..... Zone..... State.....

BOSTITCH

fastens it better, AND FASTER with wire

ALL TYPES OF MACHINES FOR APPLYING STAPLES

ALL TYPES OF STAPLES APPLIED BY MACHINES

Trade-Mark "Bostitch" Registered U. S. Patent Office and Foreign Countries

FASTER.. ..MORE EFFECTIVE FIRE CONTROL

WITH THE ANSUL *Stream Pattern*

..plus BETTER HEAT-SHIELD PROTECTION

Exclusive Features

- Water-tight construction.
- Provides a modified cone-shaped stream pattern without hole in the center of the stream.
- Each nozzle gas pressure tested after assembly.
- Special spring loaded packing to insure lasting water-tightness.
- Designed for use by inexperienced operators.
- Low velocity, more effective stream of dry chemical.

Why Advertise the Nozzle! . . . .

. . . . because the **nozzle** on your ANSUL Dry Chemical Fire Extinguisher is **water-tight** . . . it won't become inoperative due to corrosion or caking of dry chemical within the working parts . . . the most inexperienced man in your plant **can use the ANSUL extinguisher effectively . . . *and only Ansul has a nozzle*** to meet all of these requirements!

If your hazards require special long range straight stream nozzles, you can get Ansul Extinguishers equipped with these nozzles at no extra cost. With Ansul Dry Chemical Fire Extinguishing Equipment you have not only the best fire protection but also a choice of models and designs to meet your requirements.

Send for File No. 642. You will receive our latest catalog, a Periodic Inspection Record Chart, "Fundamentals of Fire Extinguishment" and information about Ansul Dry Chemical Piped Systems for automatic protection.

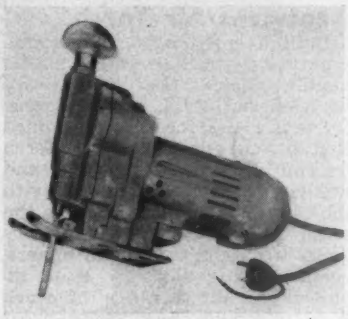
ANSUL
CHEMICAL COMPANY
FIRE EXTINGUISHER DIVISION
MARINETTE • WISCONSIN

DISTRIBUTORS IN ALL PRINCIPAL CITIES IN THE U.S.A., CANADA AND OTHER COUNTRIES

THIS TRADE MARK ASSURES YOU OF QUALITY PRODUCTS

capacity. They cover a boring range of from ⅜ to 20 in.

The Maxwell Co., 510 Broadway, Bedford, Ohio.



Precision Saw for Composition Materials

The Whiz Saw Model No. 2 is said to be a precision tool for cutting wood, bone, fiber, and other composition materials up to 2 inches thick. When equipped with a highspeed blade, the unit will also cut light-gage metals. It can be used as a rip, crosscut, or scroll saw. Weight is 6¾ lb.

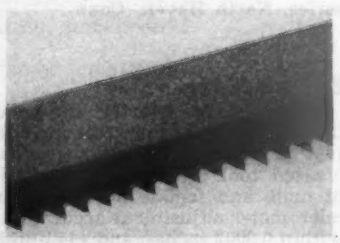
Forsberg Mfg. Co., Bridgeport, Conn.

Highspeed Wood Bits

The Herbrand people claim their new line of wood bits will bore end grain, side grain, partial holes, through knots, and at any angle from 45 to 90 degrees in wood, plywood, plastic, etc. Whiz Bits fit standard power tools with key-type ¼-in. chucks.

Forged from molybdenum steel, the bits can be sharpened with a flat file. Available in sizes from ⅜ to 1⅛ in. in diameter, extended lengths from 6 to 60 in.

Bingham-Herbrand Corp., Herbrand Div., Fremont, Ohio.



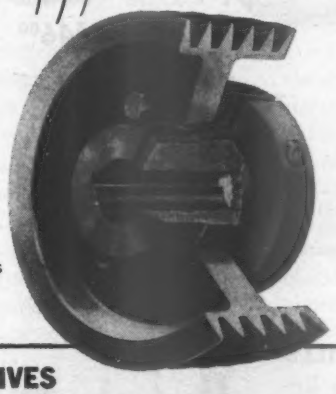
Double-Welded Hacksaw Blade

Three strips of steel are welded together in the Safe-Flex power hacksaw blade to provide the necessary hardness and toughness for shatterproof, highspeed cutting. A highspeed steel cutting edge is

Don't buy a V-Belt Drive unless–

1. the sheave comes in two parts for easy mounting—separately or as one-piece assembly[a]
2. the hub and rim are "taper-mated", for friction cone grip and positive press fit on shaft[b]
3. the clamped hub holds shaft position when rim size is changed—no realignment problem[a]
4. I-beam spokes on driven sheave help carry heavier load with less weight[a]
5. the belt carries the load with minimum internal friction[c]

a Worthington exclusive
b Worthington original
c Worthington-Goodyear original—endless load-carrying cords in neutral axis



WORTHINGTON MULTI-V-DRIVES

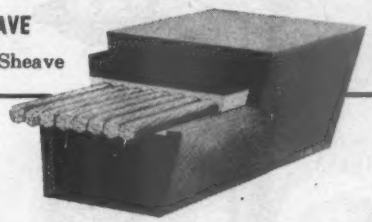
Easy to get on

Easy to get off

Yet always tight on the shaft

WORTHINGTON QD SHEAVE

Original Tapered Cone-Grip Sheave



WORTHINGTON-GOODYEAR EC CORD V-BELTS

Each endless cord carries an equal share of the belt load—each belt, matched and uniform in length, carries an equal share of the drive load.

Send coupon for latest Worthington QD Sheave bulletin, V1400B7F

Complete Range of QD Stock Sizes— Prompt Shipment 853 listed stock sizes in "A", "B", "C", and "D" sections fhp to 600 hp... 332 listed stock sizes of EC Cord V-belts.

It was a crisis that occurs only on Saturday mornings

Minutes before noon on a Saturday morning, a frantic call to **Oberjuerge Rubber Distributing Co.**, St. Louis, Mo. reported a motor failure at a brickyard.

A week's stoppage of production was threatened.

A different motor was available, but not the right rpm.

Could Oberjuerge furnish belts and sheaves to give the proper speed? Answer (after some quick calculations): yes—two Worthington QD Sheaves, 8 groove, 16 in. driver, 58 in. driven, with a set of 8 Worthington-Goodyear V-Belts.

By mid-afternoon, the brickyard was back in production. Again, a Worthington distributor had saved the day—or, in this case, a week!

WORTHINGTON

ORIGINATORS OF THE QD SHEAVE
WORTHINGTON PUMP AND MACHINERY CORPORATION
MULTI-V-DRIVE SALES DIVISION
Buffalo, N. Y. • *General Offices:* Harrison, N. J.

POWER TRANSMISSION: sheaves, V-belts, variable speed drives
PUMPS: centrifugal, power, rotary, steam
AIR COMPRESSORS: water-cooled, air-cooled

The Good Right Hand of Industry

Worthington Pump and Machinery Corp.
Multi-V-Drive Sales Division,
Buffalo, New York

Send Bulletin V1400B7F on Worthington Multi-V-Drives.

Name.....
Company.....
Address.....
City.....Zone....State.....

INSURE PRODUCTION *NOW* with *Milwaukee* TOOLS

Long famous for their *surplus* power and high torque, "Milwaukee-built" motors are standard equipment in all Milwaukee portable electric tools . . . in addition to modern design and ball-bearing construction. You'll be amazed at their service-free, continuous performance in production and maintenance work.

Milwaukee HOLE-SHOOTER (Pistol drill) . . . widely used in aircraft, automotive and other metalworking plants. Speeds—650, 1000, 2000, 3500 and 5000 R.P.M. Capacities—¼", 5/16", ⅜". Wt. 3¾ to 4¼ lbs. AIR-COOLED.

$39.50 to $46.00

EXCLUSIVE SPLIT-BODY DESIGN. Permits inspecting, cleaning and adjusting all electrical parts under full-speed operation.

HEAVY-DUTY PRODUCTION DRILLS

Notable for *reserve power*, for electronically balanced and highly insulated armatures, for air-cooling systems that circulate *four times as much air as is customary*, and for their fatigue-relieving weight balance, Milwaukee heavy duty drills are built for day-after-day heavy drilling and reaming.

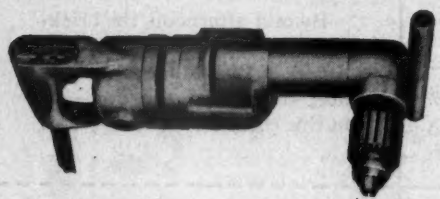
For the ¾" drill pictured, as well as ½" and ⅜" models, the heavy-duty Jacobs Chuck is standard, and a Morse Taper Socket is optional.

½" to ⅞"

$58.00 to $94.00

MAINTENANCE MAN'S FAVORITE . . .

3-SPEED ½" RIGHT-ANGLE DRILL



NATIONALLY ADVERTISED

S-412 complete with Right-Angle Drive

$69.00

America's only 3-speed Right Angle Drill. Suitable speeds for drilling in wood, metal, masonry, concrete and tile . . . 300, 450 and 675 R.P.M. Uses wood bits up to 3" — also carbide-tipped drills. Wonder-tool for close quarters.

SEE YOUR DISTRIBUTOR

Get our FREE 48-page catalog now, with complete information on Milwaukee portable electric drills, screw shooters, nut setters, saws, hammers, sanders, polishers, portable and bench grinders.

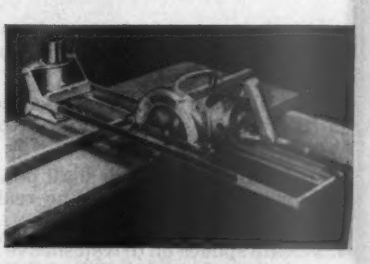
MILWAUKEE ELECTRIC TOOL CORPORATION

5346 W. STATE STREET • MILWAUKEE 8, WISCONSIN

welded to a medium hard steel center, which, in turn, is welded to an extra-tough steel backing. This construction combines strength with impact resistance.

Safe-Flex blades come in standard power hacksaw sizes with 4, 6, or 10 teeth per inch.

The L. S. Starrett Co., Athol, Mass.

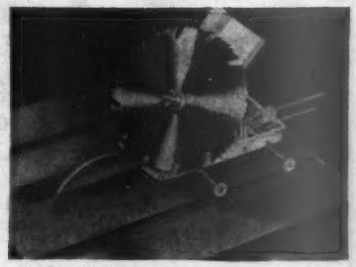


Saw Guide Adapter for Portable Electric Saws

The fully portable Skilsaw guide converts an electric hand saw into a radial saw in a matter of seconds. With simple adjustments, crosscuts, miters, rips, and bevel cuts can be made.

You can clamp the 26-lb. unit to a small platform set up on two saw horses. The guide will accommodate popular-make saws with a base width capacity ranging from 4 13/16 to 5⅛ inches.

Skilsaw, Inc., 5033 Elston Ave., Chicago 30.



Saw Sharpener Attachment

The Tru-Circle saw sharpener will gum, joint, and sharpen combination, crosscut, rip, or novelty blades from 6 to 10 inches in diameter right on your own saw table. You can also use it for touching up the raker teeth of combination blades.

The fixture is a simple metal frame with an upright carrier jig. Fixed with adjustable outrigger and grippers, the entire unit is movable forward or backward in the mitre slots of any saw table.

A. D. McBurney, 317 E. 4th St., Los Angeles 13.

More on next page

One of a series of messages to plant managers and purchasing agents to show how General Electric's *specialized* plastics molding service offers important advantages to selected industries.

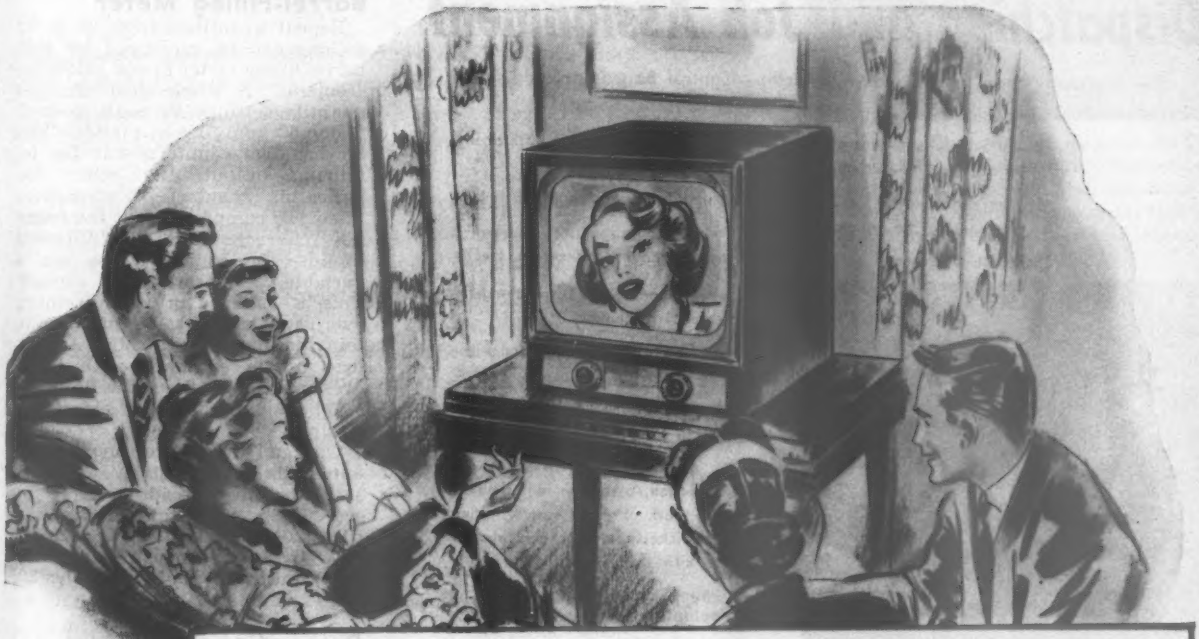
Specialized MOLDING SERVICE

PRODUCES LOW-COST, MASS-PRODUCED PLASTICS TV CABINETS!

Manufacturers incorporating large plastics parts in their products are depending more and more on the mass-production savings of General Electric plastics molding service—for improved products.

For example, eye-appealing, rugged G-E plastics cabinets for television manufacturers are turned out every few minutes by G.E.'s giant presses. Other inexpensive, attractive, durable products of General Electric plastics molding service include molded TV and radio cabinets, refrigerator freezer doors, snack boxes, and business machines. In many cases, General Electric has made possible substantial cost reductions on molded parts.

For many manufacturers, General Electric plastics molding service is an integral part of their own assembly lines for the large-volume production of top-quality plastics parts—both molded and extruded. General Electric's many years of plastics molding experience may help *you* to cut costs and improve your products.



G.E.'S SPECIALIZED MOLDING SERVICE IS GEARED TO INDUSTRIES LIKE THESE:

Television & Radio	Air Conditioning	Automotive
Refrigerator	Washing Machine	Small Appliance

You can put your confidence in

GENERAL ELECTRIC

This shop dispatching system proved so satisfactory, that it has been extended throughout the Jacobs (Chuck) Manufacturing Plant . . . even in the engineering drafting department, insuring . . .

Fool-Proof Machine Loading, Dispatching and Job Assignment

One four-copy form and McCaskey Machine Control Boards provide these and numerous other cost-cutting results:

Visual Scheduling . . . a glance at the board shows volume of work ahead for each machine or man.

Sequence of Orders . . . quickly indicated by arrangement of tickets representing the orders.

Schedule Changes . . . simply made by rearranging tickets to specify new sequence.

No Delay Between Planning and Dispatching . . . no lists or records to change.

Operation According to Plan . . . assured without consulting supervisor for assignments.

Subordinates Quickly Trained and Work Delegated . . . close supervision easy.

The system is so flexible that it is readily adapted to production, assembly, maintenance and construction work of every variety, using shop orders, time tickets, move tickets, tabulating cards, etc. with the Boards.

Mail the coupon today for complete details.

THE McCASKEY REGISTER CO.
ALLIANCE, OHIO

Please send me folders describing McCaskey Machine Loading, Dispatching and Job Assignment.

Name .....

Position .....

Company .....

Address .....

FMM 2-51

McCaskey
INDUSTRIAL CONTROLS
PRODUCTION • INVENTORY • TOOLS • COSTS • PAYROLL

WHAT'S NEW IN EQUIPMENT

Begins on page 132

MEASURING & CONTROL APPARATUS

Barrel-Filling Meter

Repeat quantities from 25 to 79 gallons can be measured by this barrel-filling meter in one gallon increments. A single gear changes quantity settings; no tools needed.

The 60 gpm., 1½-in.-pipe-size meter has two counters—one for totalizing output, the other for indicating number of containers filled. To compensate for the foaming characteristics of different liquids, the control valve has a variable deceleration on shutoff. This is said to prevent foaming over, and at the same time maintain maximum flow rate. A non-drip nozzle equipped with back-pressure valve retains the liquid in the hose on shutoff for maximum accuracy.

Optional accessories include an automatic temperature compensator to convert readings to 60 degrees F. Special meters for handling corrosive liquids are available.

A. O. Smith Corp., Meter Div., 5715 Smithway St., Los Angeles 22.

Proportional Air Velocity Controller

For automatic temperature and air conditioning control systems, Johnson Service Co. has developed a proportional-action velocity mechanism that controls air velocities in the 50 to 250 fpm. range. The unit was designed primarily for fume hoods used in working with radioactive material, where a fixed velocity must be maintained with variable door openings.

Regulator operation is based on

What

NEW STANOIL'S

longer life means to you . . . . . .

For fourteen years STANOIL Industrial Oils have proved their ability to handle a wide variety of jobs in midwest plants. Now, these established products have been made better than ever! They offer new and important savings in an even wider variety of equipment because:

1. **Greater oxidation stability** in the New STANOILs enables them to stand up under high temperatures of operation, maintain low acidity for long periods of time, and reduce to the minimum deposits caused by oil oxidation.

2. **High Viscosity Index and Low Pour Point** enable STANOILs to perform satisfactorily through a wide range of temperatures. They flow readily at low temperatures and do not thin out excessively at high temperatures.

3. **Greater protection against rust** has been provided by the addition of a corrosion inhibitor of an advanced type to all grades of New STANOIL. This inhibitor prevents corrosion trouble by "plating out" on surfaces that tend to rust. New STANOILs have practically put an end to rust and corrosion troubles.

At the right are shown several types of equipment in which the New STANOILs can save you money and maintenance time. A Standard Oil Lubrication specialist will help you find still other applications where versatile STANOILs can replace many special-purpose oils. You can reach this man quickly and easily through your local Standard Oil Company (Indiana) office. Contact him today. Or, if you wish, write Standard Oil Company (Indiana), 910 South Michigan Avenue, Chicago 80, Illinois.

In Hydraulic Systems. Because of the high viscosity index and low pour point of the New STANOILs, they provide smooth operation in hydraulic systems regardless of widely varying temperatures. They also eliminate foaming, which is frequently troublesome in hydraulic operation. Their high oxidation stability eliminates deposits that could cause valve sticking and wear.

In Compressors. Because of the oxidation stability and low carbon-forming characteristics of STANOILs, carbon deposits on valves are reduced in air-compressor operation. The New STANOILs separate readily from water—no troublesome emulsions in compressor crankcases.

In Reduction Gears. Because of STANOIL's resistance to acidity and to deposit formation, gear cases of reduction gears remain clean. The oil may be used for longer periods with no danger of excessive wear of gears and bearings.

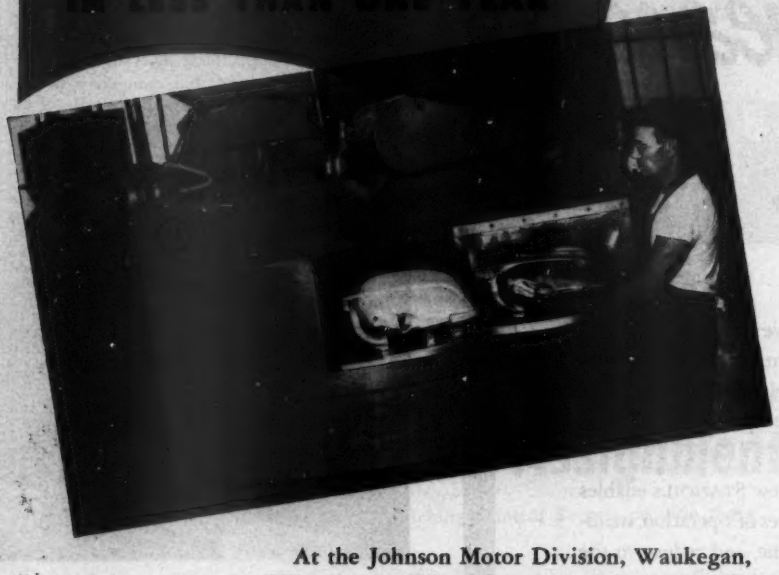
STANDARD OIL COMPANY (INDIANA)

STANDARD

WHEELABRATOR®

AIRLESS BLAST CLEANING RETURNS INVESTMENT IN LESS THAN ONE YEAR

for JOHNSON *"Sea-Horse"* motors



☆ REDUCED POROSITY

☆ IMPROVED FINAL FINISHING

☆ LESS HAND POLISHING

☆ INVESTMENT RETURNED IN 10 MONTHS

At the Johnson Motor Division, Waukegan, Illinois, two Wheelabrator machines not only returned the entire cost of the equipment, but also made a 25% profit on the investment . . . in one year.

At the same time "Wheelabrating" has provided these extra benefits: Finishing Operations on aluminum die castings have been improved by providing a more uniform surface; at least 40% of the porous castings that would have been "leakers" now pass the water test after shot peening; minor imperfections which previously required hand buffing are now removed, with the result that polishing takes less labor time and paint adheres more firmly; many of the smaller burrs and flash are removed, which greatly reduces the cost of manual deburring.

Benefits like these are too important to overlook . . . perhaps the Wheelabrator can do the same for you . . . why not investigate it soon?

New, informative book gives complete, concise information on all phases of airless blast cleaning. Write today for Catalog No. 74-A.

American

WHEELABRATOR & EQUIPMENT CORP.

374 S. Byrkit St., Mishawaka, Ind.

the proportional relationship between the velocity of air moving between two points and the difference in pressure between the two points. The instrument responds to pressure variations as small as 0.0001 in. of water, and controls velocities within plus or minus 10 fpm. Maker will supply further details in Apparatus Bulletin R-315.

Johnson Service Co., 507 E. Michigan St., Milwaukee 2, Wis.

Dimensional Air Gage

The Federal Dimensionair for gaging hole diameter variation is said to combine unusual measuring range and clearance with a high degree of stability. This dimensional air gage has a measuring range of 0.003-in. hole diameter variation. User can check hole size as it approaches the required dimension in a machining operation without changing plugs.

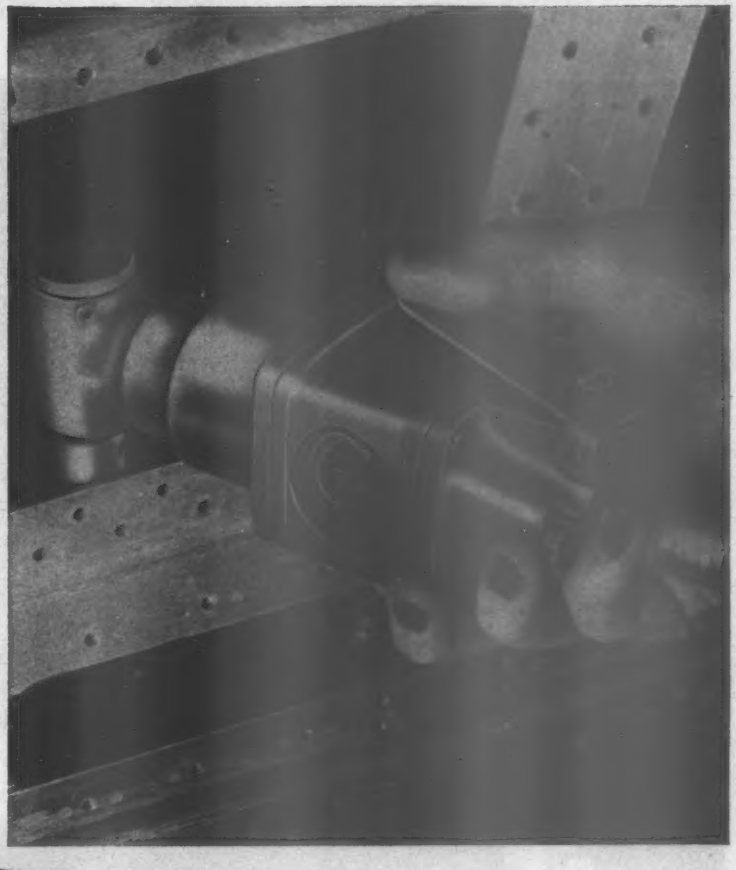
Drift is said to be negligible over a period of weeks. Maker claims variations as small as five-millionths of an inch can be determined. Normal operating pressure can range from 40 to 100 psi. Pressure fluctuations do not affect gage accuracy. Air pressure at the jets enables the plug to be used in coolants or oil. An increased plug clearance prevents grit and dirt from interfering.

Federal Products Corp., 1144 Eddy St., Providence 1, R. I.

Pneumatic Transmission System Controller

Designed for pneumatic transmission systems that record and control temperature, pressure, flow, or liquid level, the Transet Tri-Act controller utilizes the basic process control responses of conventional controllers in a manner said to provide closer process control without under- or overshooting.

The system circuit contains two closed loops in series—the first with fixed proportional response and ad-



Compactness of CP-337 with 90° angle head speeds assembly work where nuts are hard to reach.

45° angle head on this CP-344 permits quick and easy location of socket on 5/16" frame bracket bolts.

for faster and easier bolt and nut running

—on production lines, and in maintenance work—reversible CP AIR IMPACT WRENCHES speed operations, cut costs. There's no twisting thrust to fatigue operator.

Complete line from CP-337 (¼" bolt size) to CP-365 (1¼" bolt size) meets every requirement. The only complete line of impact wrenches with angle heads available in all sizes to reach awkwardly located nuts, bolts or studs.

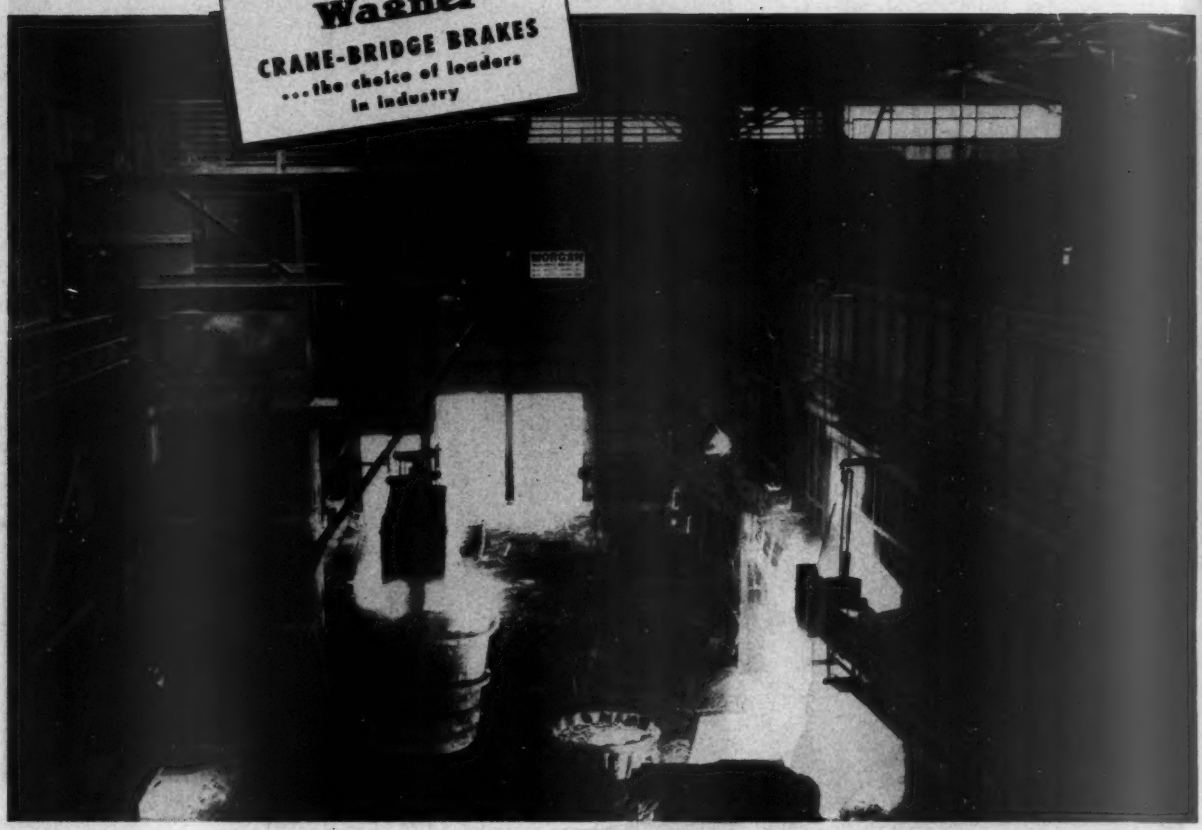
Capacities—Bolt Size

CP-337	¼"
CP-344	⅜"
CP-3440	⅜", heavy duty
CP-349	⅝"
CP-360	¾"
CP-3630	¾", heavy duty
CP-365	1¼"

CHICAGO PNEUMATIC TOOL COMPANY

General Offices: 8 East 44th Street, New York 17, N. Y.

PNEUMATIC TOOLS • AIR COMPRESSORS • ELECTRIC TOOLS • DIESEL ENGINES
ROCK DRILLS • HYDRAULIC TOOLS • VACUUM PUMPS • AVIATION ACCESSORIES



Granite City Steel "plays safe" with Wagner Hydraulic Crane-Bridge Brakes

At Granite City Steel Company, one of the most modern plants of its type in the nation, Wagner Hydraulic Crane-Bridge Brakes provide "full control" for heavy ladle cranes like those shown above, and for other overhead traveling cranes, as well.

Wagner Hydraulic Brakes provide even the heaviest cranes with controlled deceleration and smooth, precise stops . . . as accurate and easy as braking an automobile—and just as safe.

All Wagner Hydraulic Braking Systems are equipped with the exclusive remote control bleeder that keeps the lines full of fluid for peak braking efficiency and makes bleeding the system a simple "one-man one-minute" job. Other features include: a self-centering device that prevents brake shoe drag by assuring equal clearance of both shoes . . . power failure braking . . . one-point shoe adjustment . . . 200% emergency torque . . . and non-scoring, easily replaceable, molded lining blocks.

You can handle any crane braking application with Wagner Hydraulic Brakes—they come in four sizes, with or without parking attachment. If your cranes are not equipped with Wagner Brakes, we can show you how simple it is to install a modern hydraulic system. If you now have old-style Wagner Brakes, your system can be quickly modernized with our complete conversion kits.

Bulletin IU-40 gives full information —write for your copy.

Wagner Electric Corporation
1891 WE 1951

WAGNER ELECTRIC CORPORATION
6412 Plymouth Ave., St. Louis 14, Mo., U.S.A.

ELECTRIC MOTORS • TRANSFORMERS • INDUSTRIAL BRAKES
AUTOMOTIVE BRAKE SYSTEMS — AIR AND HYDRAULIC

BRANCHES IN 31 PRINCIPAL CITIES

BI-1

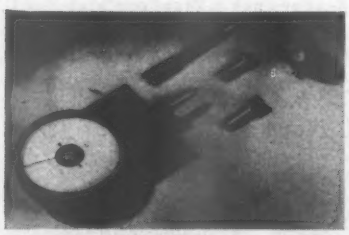
justable rate action, the second with adjustable proportional response and adjustable automatic reset. Composite effect of these responses is to permit start-up and pneumatic setting with no overpeaking. Circuit design is said to allow four times faster reset rate and rate action than conventional design. Company Bulletin 98097 tells the complete story.

Taylor Instrument Companies, 95 Ames St., Rochester 1, N. Y.....

Hydraulic Crane Scale With Tilted Face

A tilted dial face is now available in the Hydroscale line of hydraulic crane scales up to 100,000 lb. capacity. Face may be tilted downward 25 degrees to facilitate readings taken at a substantial distance from the floor.

Hydroway Scales, Inc., 20624 West 8 Mile Rd., Detroit 19.



Hand Tachometer

A revolving Alnico permanent magnet inside of a drag cup gives the Smiths Model A.T.H. 10 tachometer its high sensitivity. Guaranteed accuracy over the 1000 and 5000 rpm. ranges is ½%. Torque required is low—0.4 oz./in. on the low range.

Equipoise Controls, Inc., 100 Stevens Ave., Mount Vernon, N. Y.

More on next page

"A penny saved is two pence clear"

—Ben Franklin's "Necessary Hints," 1736

In days when venture capital comes not forth, cutting costs in thy shop plows money back into thy business.

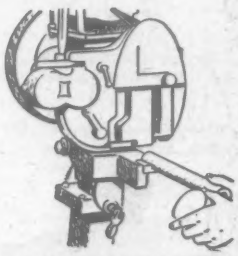
—Acme Steel Notebook, 1950

How healthy does *your* profit margin look in the face of higher taxes, higher costs?

Now—when pennies saved can mean the difference between profit and loss—is the time to observe the old American business virtues of *efficiency* and *thrift*.

Improved efficiency and greater thrift in the fields of packaging, shipping and materials handling are exactly what Acme Steel methods and products are achieving for some 50,000 users in almost every industry.

A written request on your business letterhead, specifying the Acme Steel products in which you are interested, will bring you free booklets containing full details.



Automotive and aircraft industries rely on Acme-Morrison Metal Stitchers for fastening metal-to-metal and metal-to-other materials.

Stitching cartons with an Acme Silverstitcher is usually two to five times faster than other methods of carton assembly.

ACME STEEL COMPANY

Dept. FM-21, 2838 Archer Avenue, Chicago 8, Illinois

There are 46 Acme Steel service offices in the U.S. and Canada.

ACME STEEL CO. CHICAGO

ACME STEEL

Acme Steel depends on a lot of other businesses, big and small. We buy each year about 35,000 items, ranging from coal and semi-finished steel to paper clips from some 1800 suppliers all over the country.

ACME STEELSTRAP flat steel strapping and ACME UNIT-LOAD carload bracing BAND, SEALS and TOOLS • ACME SILVERSTITCHER machines • ACME SILVERSTITCH stitching wire • ACME-MORRISON METAL STITCHERS and BOOK STITCHERS • ACME-CHAMPION BAG STITCHERS • ACME HOT AND COLD ROLLED STRIP STEEL • ACME-GALVA-BOND steel slat stock for Venetian blinds • ACME STEEL SPECIALTIES, including hoops, corrugated fasteners, nail-on strapping and other container reinforcements • ACME STEEL ACCESSORIES—snips, cutters, punches, tool mounts, reel stands, coil holders, coil trays.

CLEANS ANY FACTORY FLOOR IN 1 FAST, EASY OPERATION!

It's a fact! *Traffic-packed grime . . . incrusted grease, dirt and metal cuttings . . . rubbery layers of dried paint . . . granite-hard blobs of spilled concrete*—in fact *any* kind of soilage on floors can be whisked off in minutes with a Tennant Floor Machine.

Expressly designed for tough jobs that usually take hours or days of tedious hand scraping, the self-propelled Tennant Machine cleans any floor in one operation. And it's an easy one-man job. There's no scraping, no messing with water or chemicals, no "sweeping up" to do.

Dirt is cut loose with fast-cutting drum type steel wire brush or Revo-tool, then hurled into built-in soilage hopper; lighter dust is sucked into vacuum bag. Action of high speed 12" or 16" brush smooths and levels floor surface.

Result: a smooth, clean, *dry* floor—ready for immediate traffic.

6 TYPICAL ADVANTAGES

1. REQUIRES ONLY 1 MAN.
2. CUTS CLEANING COSTS as much as 50%.
3. DRY CLEANS; no messy chemicals or water.
4. REDUCES HAZARDS; keeps floor dry, smooth.
5. CLEANS ANYWHERE; doesn't halt plant operation.
6. IDEAL FOR ANY TYPE of shop floor.

NEW REVO-TOOL . . . 9,856 *Impacts Per Second!*

Has hundreds of drum-mounted alloy-steel cutters to provide a scarifying and pulverizing action for cleaning and leveling floors. High speed hammer-mill action removes grease, tar, chips, paint, cement.

STEEL WIRE BRUSH

Contains twisted tufts of strong steel wire (20, 30 & 39 gauge) mounted in diagonal pattern—won't clog nor streak. Brush is reversible for self-sharpening. Excellent for average soilage. Revolves at 1760 RPM.

TENNANT machines are available with electric or gasoline motors.

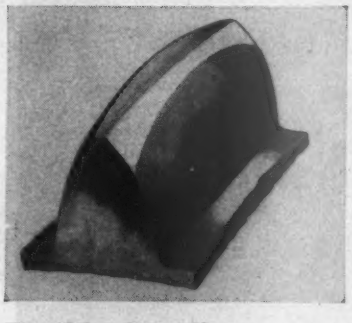
WRITE or WIRE TODAY for a FREE inspection of your floors. There is a TENNANT factory representative in your vicinity.

The way to finer floors
TENNANT
Floor Maintenance System

G. H. TENNANT CO.
2554 N. 2nd Street • Minneapolis 11, Minn.

Begins on page 132

MECHANICAL POWER TRANSMISSION



Flexible Coupling

The contacting surfaces of the external teeth in the Amerigear flexible coupling have been crowned to increase load capacity and reduce backlash. Crowning reduces the clearances required and keeps stress down at the weakest part of the gear tooth—the tooth-end.

The external teeth are also chamfered along the edges to prevent them from striking the fillets at the roots of the internal teeth. Maker claims that crowning and chamfering permit unusual amounts of shaft misalignment. For specifications ask maker for Catalog 501.

American Flexible Coupling Co., Erie, Pa.

Cutout Coupling

The Anchor cutout coupling gives full overload protection to machine tools, process equipment, conveyors, etc. — yet doesn't leave you with a sheared pin to replace every time trouble strikes.

The unit is a flexible coupling with torque-sensitive cutout protection. When a machine is overloaded, the coupling immediately shuts off the power, then resets itself automatically. Two sizes are available with working ranges from 10 to 2000 in.-lb.

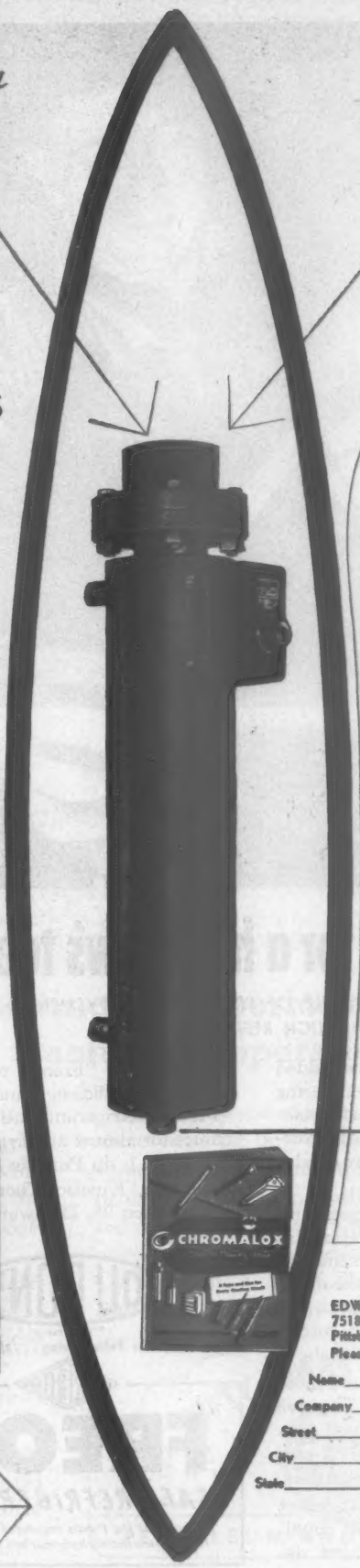
Anchor Steel & Conveyor Co., 6906 Kingsley Ave., Dearborn, Mich.

More on next page

dependable Heat that is economical-efficient-easy to use

CHROMALOX ELECTRIC Circulation Heaters

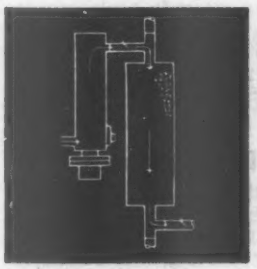
for heating liquids preheating fuel oils heating compressed air and other gases



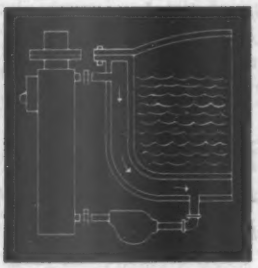
Production costs go down . . . operating efficiency goes up when you install economical CHROMALOX Circulation Heaters. They give you measured quantities of heat, at temperatures up to 750° F. that can be rapidly reached and accurately controlled. Dependable, around-the-clock operation, minimum maintenance.

Uses include: Water heating applications such as steam boilers and accumulators; jacketed chemical kettles, tanks and processing equipment. Preheating fuel oils; heating Dowtherm, Aroclor, Prestone or heat transfer oils. Heating nitrogen, air and other gases, drying steam, plastic powders and other process work.

HERE ARE TWO TYPICAL APPLICATIONS



Heating Nitrogen to Reactivate Alumina



Heating Oil-Jacketed Kettle

CHROMALOX

Electric Heat for Modern Industry

check these advantages of CHROMALOX Electric Heaters

1. Efficient heat when and where you need it.
2. Economical initial cost; low installation and operating costs.
3. Accurate temperature control — thermostatically or manually regulated.
4. Wide selection to meet your specific heat requirements.
5. Improved process, production and product with fewer rejects.

for more information
Write for Catalog 50

It has complete data on many of the 15,000 Chromalox Electric Heaters and Equipment used in modern industry.

EDWIN L. WIEGAND COMPANY
7518 Thomas Boulevard
Pittsburgh 8, Pa.
Please send Catalog 50

Name_____
Company_____
Street_____
City_____ Zone____
State_____

IC-47

More bite for a hacksaw's teeth

ANOTHER EXAMPLE OF PRODUCT IMPROVEMENT THROUGH REFRIGERATION

Today manufacturers have added another step to the heat-tempering process used to give strength to hacksaw blades. Now blades are also *cold-tempered* to give them even greater hardness.

Blades are "frozen" in special refrigeration units at temperatures as low as 120°F. below zero. This changes the crystalline structure of the metal . . . gives blades the strength to last up to 113% longer, with a corresponding cut in replacement costs.

Industry is finding more and more uses for refrigeration—to improve products, cut costs and speed production. It's a subject that is well worth discussing with your engineers.

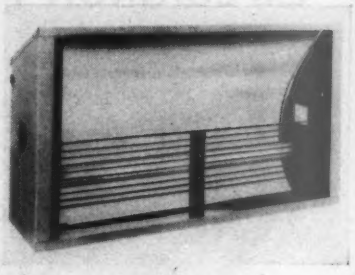
And when you're ready to select industrial refrigeration or air conditioning, ask about equipment designed to use "Freon" refrigerants. For safety, efficiency and economy, "Freon" refrigerants are the logical choice for almost any type of installation. E. I. du Pont de Nemours & Co. (Inc.), "Kinetic" Chemicals Div., Wilmington 98, Delaware.

DU PONT
REG. U. S. PAT. OFF.
Better Things for Better Living . . . through Chemistry

KINETIC
FREON
SAFE REFRIGERANTS
"Freon" is Du Pont's registered trade-mark for its fluorinated hydrocarbon refrigerants

Begins on page 132

PLANT HOUSEKEEPING & SANITATION



Ultraviolet Ray Disinfector

Ultraviolet germicidal rays are fine for purifying and freshening indoor air, as long as they are concentrated on the bacteria and not on someone's sensitive skin and eyes. The Air-Tron disinfector passes this test by concentrating its germ-killing energy where the germs are, but the people aren't.

The unit directs its bacteria-killing rays across the upper area of the room without reflecting any energy from the ceiling down into the working areas. Natural convection currents do the rest, bringing the germ-laden room air up through the rays and then back down again fresh and pure.

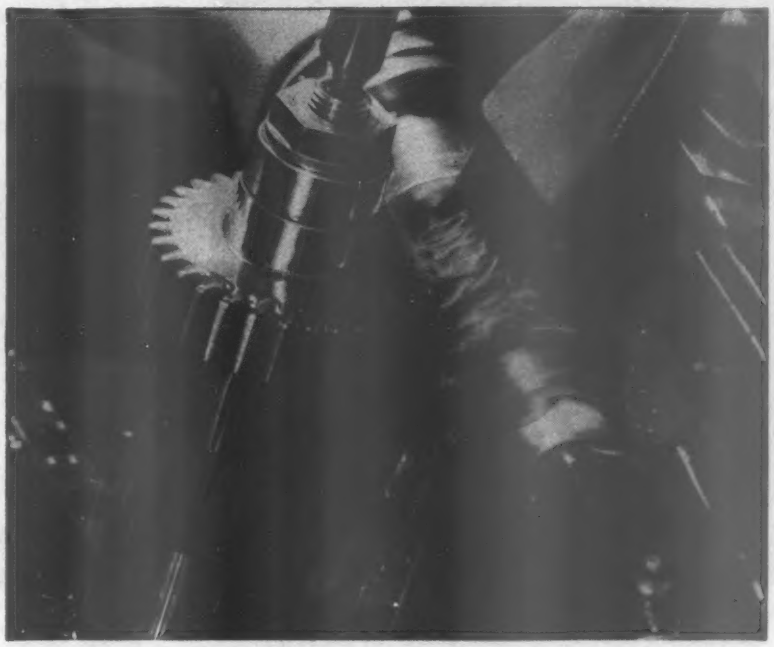
Air-Tron can be used in plant lavatories and cafeterias, in special processes, in laboratories, or wherever else a germ-free atmosphere is desired. Units for purifying up to 80, 150, or 425 sq. ft. come equipped for wall mounting.

Roy C. Stove & Co., Chicago, Ill.

Heavy-Duty Vacuum for Wet or Dry Pickup

Since the Hild Vacuum doesn't depend on the vacuum air stream for motor cooling, it's suited for both wet and dry pickup without adjustment. A separate cooling fan has the job of keeping the motor running cool.

Other design features include string-guards to keep the ball-bearing swivel casters rolling freely and swivel-type hose connections



Out of Gulf Research Laboratories—

NEW IMPROVED CUTTING OILS

that are setting new performance records on tough machining operations

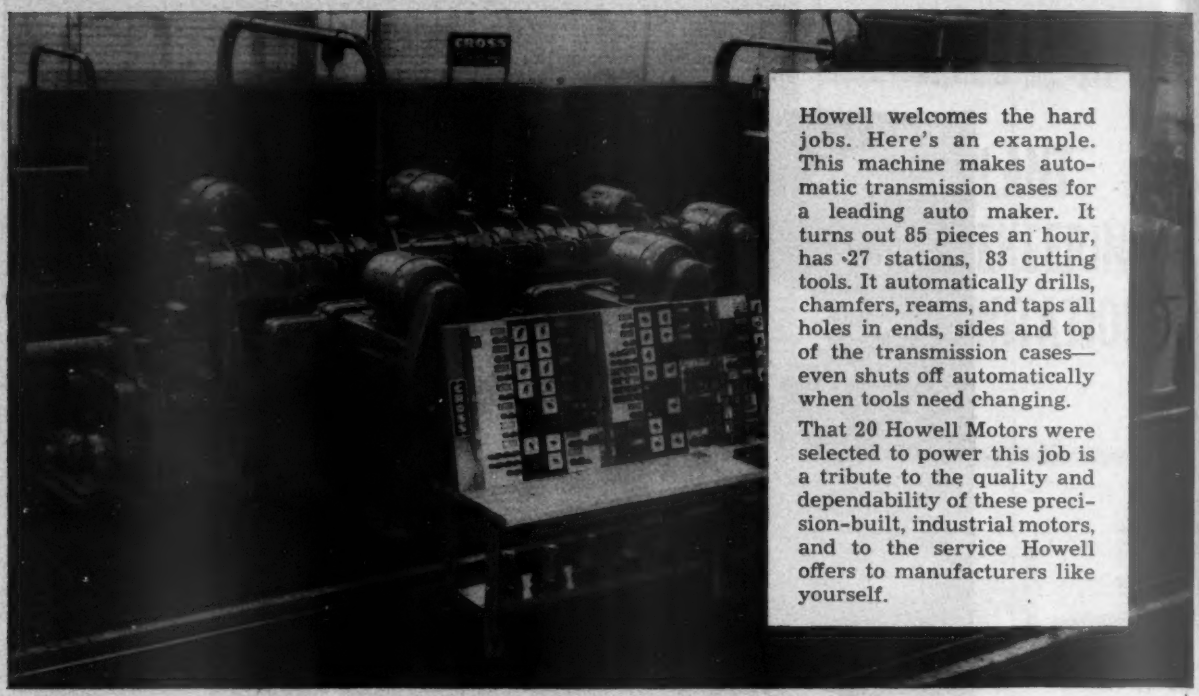
Gulf announces an outstanding improvement in sulphurized cutting oils! The new Gulf Lasupar Cutting Oil and Gulf Electro Cutting Oil provide greatly increased sulphur activity—without the objectionable odor ordinarily associated with cutting oils of this type.

Sulphur, recognized as the most effective anti-weld agent, is combined in these oils by a special Gulf process so that it is uniquely active over the entire range of a cutting operation.

To machine shop operators this extra chemical activity means higher production rates, fewer tool grinds, and lower costs on tough machining operations. Gulf Lasupar Cutting Oil also contains stable sulphurized fatty oil which helps produce exceptionally fine finishes.

It will pay you to investigate the advantages of these versatile new cutting oils for any troublesome job where production, tool life, or finish is a problem. Call in a Gulf Lubrication Engineer today and arrange for a test in your shop. Write, wire, or phone your nearest Gulf office. Gulf Oil Corporation · Gulf Refining Company, Gulf Building, Pittsburgh, Pennsylvania.

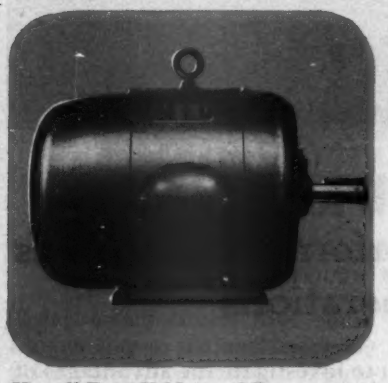
FIFTY YEARS OF SERVICE
1901 GULF 1951
PETROLEUM AND ITS PRODUCTS



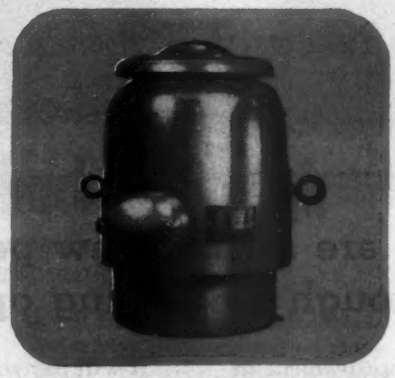
Howell welcomes the hard jobs. Here's an example. This machine makes automatic transmission cases for a leading auto maker. It turns out 85 pieces an hour, has 27 stations, 83 cutting tools. It automatically drills, chamfers, reams, and taps all holes in ends, sides and top of the transmission cases—even shuts off automatically when tools need changing.

That 20 Howell Motors were selected to power this job is a tribute to the quality and dependability of these precision-built, industrial motors, and to the service Howell offers to manufacturers like yourself.

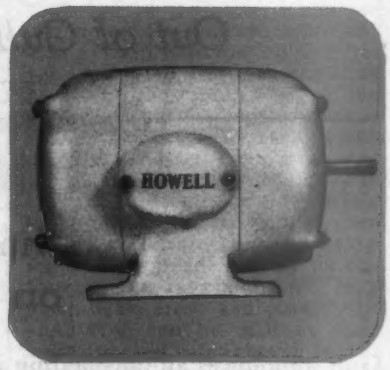
Solution for . . .
THE CASE OF AN AUTOMATIC TRANSMISSION



Howell Type K Motor. Offers constant performance in the presence of dirt, dust, fumes, and moisture. Sizes from 3 to 150 H.P. at 1800 R.P.M. Either vertical or horizontal mounting.



Howell makes specially designed motors—vertical, round body, flange and face mounting, built-in stator and rotor jobs, etc.—to meet a wide range of requirements.



Howell Sanitary Motors meet the most exacting standards of the dairy and food industries. They contain no pockets, cracks, or crevices. Available for vertical or horizontal mounting.

Read this if you need special motors

Howell offers a unique job-engineering service for special motor applications.

With it, you get: (1) cooperation of our engineering personnel; (2) prompt quotations on both standard and custom motors; and (3) the ability to accurately manufacture custom-designed motors within reasonable time.

We believe these services will save you, as a purchaser of electric motors, valuable time and money.

May we apply our facilities and engineering ability to your problem?

HOWELL MOTORS

HOWELL ELECTRIC MOTORS CO., HOWELL, MICH.

Precision-built Industrial Motors Since 1915

HOWELL Red Band MOTORS

for both vacuuming and blowing that are permanently built-in. Equipment includes attachments for cleaning pipes, ceilings, walls, venetian blinds, and machinery.

Hild Floor Machine Co., 740 W. Washington Blvd., Chicago 6, Ill.

Hand Scraper for Excess Oil and Grease

Workers probably won't waste too much valuable production time when they wipe oily hands with Hand-D-Wipe. For this Lucite scraper is actually curved to fit the fingers, and do a cleaning job in nothing flat.

Four finger cutouts and a back piece remove excess oil or grease in one operation. An added cavity takes care of the thumb. It's a device that not only the man at the machine but also maintenance men will find a time-saver. You can mount it just about anywhere it's most convenient. Oil removed from worker's hands is collected in a well for reuse or disposal.

Reliable Machine Works, 242 Eagle St., Brooklyn, N. Y.

•

POWDERED HAND CLEANSER—called Lan-O-Kleen, now contains lecithin, a compound that enhances the soap's detergency and gives a sudsing effect. Lan-O-Kleen is said to make a psychological hit with worker's hands by leaving skin smooth-feeling. West Disinfecting Co., 42-16 West St., Long Island City 1, N. Y.

STEAM-JET CLEANER—for locations where ample high-pressure steam is available, does not include a built-in boiler. Speedy-Jet Model 100 has 25 feet of hose for connecting to steam source of 80 psi. pressure or more. Ample steam and detergent lines permit steam lance to be operated up to 25 feet from dolly-mounted detergent tank. Livingstone Engineering Co., 100 Grove St., Worcester 5, Mass.

More on next page

This installation required built-up plate, welded box construction . . . fish-belly design . . . enclosed cab . . . complete weatherproofing . . . main and auxiliary hoist units (see illustration below).

How to get the most CRANE for your money

When you buy a crane, make sure you select the machine best qualified to do *your* job! The work for a crane in your plant probably differs from that in your neighbor's plant. The general crane rating and other details which are perfect for his handling problems may not be at all suitable for yours. To get the most crane for your money, let *crane duty* determine *your* choice.

It isn't entirely a matter of capacity. Travel speeds, hoisting speeds, frequency of use—all call for special consideration in the choice of a crane. That's why it's wise to discuss your problem with a Shepard Niles specialist. It's much less costly to install the *right* equipment in the beginning—than to make important changes later.

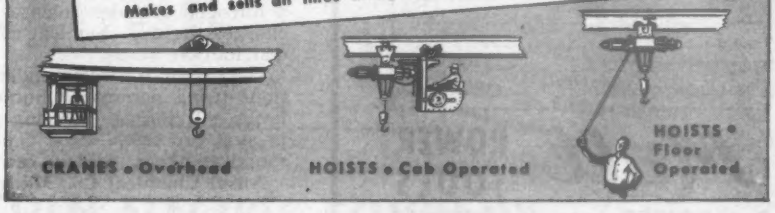
MAIN AND AUXILIARY HOISTING UNIT—Recommended for duty where there is a wide range in the capacity handled. Auxiliary hoist handles lighter loads at greater speeds than can be obtained with the main hoist.

It costs you nothing to get the facts. May we place our extensive material-handling experience at your disposal?

Shepard Niles

CRANE & HOIST CORPORATION

Makes and sells all three lifting tools for airborne shop loads



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The ¼" MallDrill that outdrills all Drills...

...and we'll prove it in your plant under your own conditions

Whatever *your* drill requirements—

- capacity
- speed
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- type of power

you'll find them in a MallDrill... for continuous, trouble-free production.

Use the coupon to request a demonstration or the useful booklet, "MORE HOLES IN A HURRY". MallDrills in all capacities—electric, flexible shaft, high-cycle, and pneumatic are available. For Mall makes the *complete* line of portable power tools.

38 Factory Service Branches in U. S. and Canada with complete parts stocks serve thousands of dealers and millions of users.

Mall Tool Company
7755B S. Chicago Ave., Chicago 19, Illinois

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Company .....

Dept. .....

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City ..... State.....

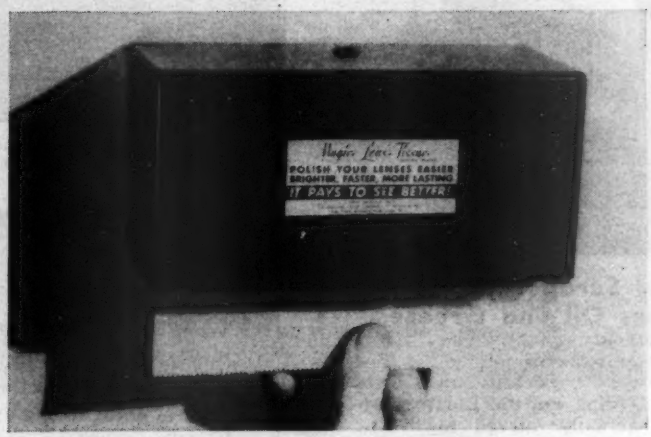
Kind of Tool.....

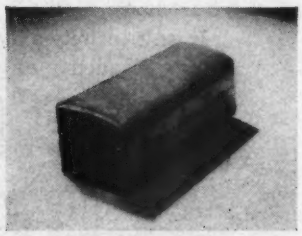
Mall REG. U.S. PAT. OFF. POWER TOOLS

Put POWER into MANPOWER

Manufacturers of over 1000 Tools for a Million Jobs

SAFETY & PLANT PROTECTION





Silicone Lens Tissue for Wall Dispenser

Silicone-treated lens tissues are now available in a simple, compact dispenser for industrial use in factory and office. The Magic Lens Tissue comes in sealed refill cartridges with interfolded sheets. To refill, you just unlock the dispenser and drop in a package of fresh tissues. Sheets are then removed one by one, paper-towel-style.

Magic Lens Tissues provide a handy means for cleaning goggles and safety glasses. They remove dust, lint, and smears from the glass, leaving a polish behind. An invisible coating of silicone remains to protect the lens. Features claimed by manufacturer are a larger-size tissue (5x6¾ in.) at lower cost, and a simple, inexpensive dispenser. The steel dispenser has no moving parts, comes with four screws for wall mounting.

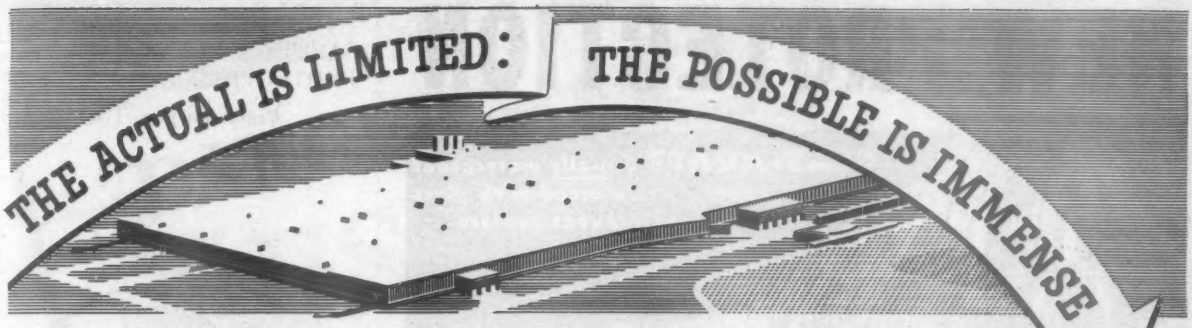
The Silicone Paper Co. of America, Inc., 230 Park Ave., New York 17.

Automatic Dry Chemical Fire Protection

The Ansul people have licked the problem of piping a dry chemical extinguisher in their new automatic fire protection system. Heart of the system is a network of heat-actuated sensing elements stategically located in danger zones. Air expands in these mechanisms with an increase in temperature, tripping a nitrogen cylinder release. The pressurized nitrogen then discharges the dry chemical compound onto the fire area through distribution heads.

The system is recommended for the protection of areas or operations using flammable liquids—paint spray booths, oil quench tanks, oil storage, pumping stations, etc. Controls can be added to stop processes, close ventilation ducts, shut off valves, and sound an alarm. System can also be tripped manually.

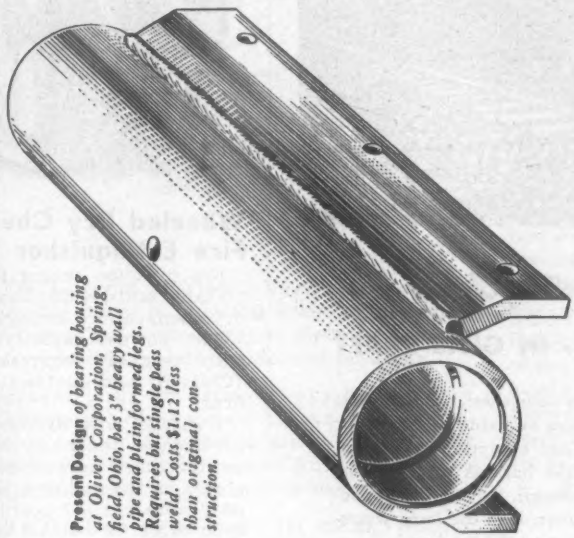
Ansul Chemical Co., Marinette, Wis. *More on next page*



NEW LINCOLN PLANT CREATED BY INCENTIVE-INSPIRED CO-ACTION IN DEVELOPING POSSIBILITIES IN PRODUCT

© LE Co. 1951

MANUFACTURER CUTS TOOLING COST $800.00



Present Design *of bearing housing at Oliver Corporation, Springfield, Ohio, has 3" heavy wall pipe and plain formed legs. Requires but single pass weld. Costs $1.12 less than original construction.*

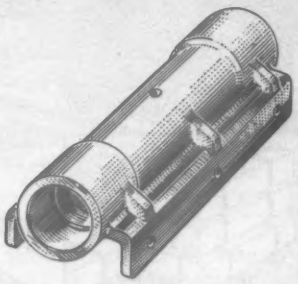
BY simple redesign to welded steel, substantial savings are being effected in the production of these bearing housings. At the same time, product strength and rigidity have been increased to assure maximum serviceability . . . long-lived operation. An initial saving of $800.00 on setup and tooling expense results from the elimination of drill jigs and boring fixtures as well as for patterns and core boxes required with the original construction.

Component parts are now preformed prior to welded assembly in a plain, low-cost, clamp type fixture. The tubing itself is bored as a simple lathe operation and the legs prepunched and bent as shown.

The resulting simplified production now possible with the welded steel construction is increasing the rate of output . . . reducing unit cost $1.12 per piece.

How To DESIGN FOR WELDED STEEL is presented in the new 9th Edition "Procedure Handbook of Arc Welding Design and Practice." Contains latest data on machine design together with cost figures. Price only $2.00 postpaid in U.S.A.; $2.50 elsewhere.

the ACTUAL



Original Cast Construction *of bearing housing required fixtures for extensive boring and drilling operations.*

increasing the YIELD

First Changeover *to welded steel design has 90° formed legs welded to thin wall tubing. Was welded top and bottom as shown.*

the IMMENSITY of the POSSIBLE

A saving in cost of 24%

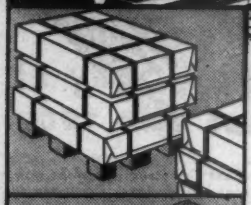
SEE HOW WELDED STEEL DESIGN SIMPLIFIES PRODUCTION

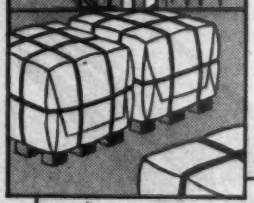
Machine Design Sheets free on request to designers and engineers. Write on your letterhead to Dept. 271,

THE LINCOLN ELECTRIC COMPANY

CLEVELAND 1, OHIO

NEW PROTECTION





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GLAS-KRAFT — The smoothest, lightest, most pliable reinforced paper available — keeps your materials, products and equipment safe from weather, wear and the hazards of transit or storage. Strong and tough, it is hard to puncture and difficult to tear. It is the most waterproof reinforced paper on the market.

***Ask for* GLAS-KRAFT . . . *the non-deteriorating, all-purpose paper.* Use it for wrapping and packaging steels and other metals, machinery, paper, leather, textiles, chemicals, cement, wirestock, furniture, etc. Use it for wraps, covers, shrouds, tarpaulins, bag, box, case and barrel liners. Use it for unitized loading of freight cars and trailers. Use it for protecting floors or curing concrete. Use it when you want a paper to perform where others fail.

Glas-Kraft has amazing all-directional strength because it contains up to 315 feet of continuous specially-treated fibers swirled into each square foot. Fibers are waterproof bonded under heat and pressure between two plies of finest specification kraft.

FREE. Send for new Glas-Kraft Folder and Prices today. Glas-Kraft is supplied to the U.S. Government in quantity. It meets JAN-P-125 specifications for barrier wrapping material, Types E-1, E-2, E-3. It also meets Federal Specifications UU-P-147, UU-P-264 and UU-P-271B.

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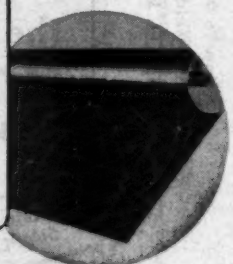
- **SEALING TAPE for Carton Closures. Five times stronger than ordinary sealing tape. Will not cut carton. Replaces string, rope, wire and strapping.**
- **GLAS-TAPE with Darex resin emulsion adhesive weatherproofs the manufacturer's joint on your cartons. Creped outer surface minimizes the joint itself.**



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GLAS-KRAFT, INC.

LONSDALE, RHODE ISLAND

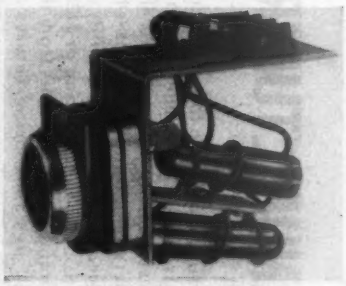
Begins on page 176)

Wheeled Dry Chemical Fire Extinguisher

For fires too severe for smaller portable units, Kidde has a wheeled dry chemical fire extinguisher with 150-lb. powder capacity. The unit will combat flammable liquid (Class B) and electrical (Class C) fires.

Carriage, with dry chemical and nitrogen cylinders, is balanced to permit 1-man operation. Discharge nozzle on the end of a 50-ft. heavy-duty hose has a 3-position stirrup-type lever for control of the powder stream. Long range discharge concentrates stream to knock heavy fires down to size quickly. Fan discharge blankets the burning area for the kill.

Walter Kidde & Co., Inc., Belleville, N. J.



Mercury Safety Switch for Hazardous Locations

This safety switch is for those hazardous locations where you don't want the sparks to fly. Unit consists of a hermetically sealed mercury switch mounted on a lever-operated armature. The actu-

SILENTLY, but ruthlessly *(even as you are reading this)* rust is gnawing away at machines, tanks, fences, pipes, fire escapes, metal sash, stacks —every rustable metal—inside and outdoors!

To protect your investment — to keep every possible pound of new steel for the defense program — to make all rustable metal surfaces last longer—*adopt rust control with RUST-OLEUM as an important part of your maintenance program.*

RUST-OLEUM stops rust! Its tough, pliable, rust-resisting film gives excellent protection that prevents rust losses under many difficult rust-producing conditions.

RUST-OLEUM can be applied *even* over rusted sufaces. It is not necessary to remove all the rust. Just use wire brush and sharp scraper to remove rust scale and loose rust. Economical and easy to use because no sand blasting or chemical pre-cleaning is required.

RUST-OLEUM can be obtained promptly from Industrial Distributors' stocks in principal cities of the United States and Canada. Anticipate your needs and order now! For complete catalog see *Sweet's*, which also lists your nearest source of supply, or write on your company's letterhead for full information.

RUST-OLEUM CORPORATION
2452 Oakton Street, Evanston, Illinois

"Rigid Economy Man!"

RUST-OLEUM
Stops Rust

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Available in many **COLORS,** aluminum and white.

CONCRETE FLOORS

GIVE NEW SAFETY and SERVICE, *too*

WITH THE
MULTI-CLEAN
METHOD

HUNDREDS OF FLOOR MAINTENANCE MEN AGREE!

Throughout the process and manufacturing industries the New Multi-Clean Method has proven to these men they can now get better service and greater safety with added beauty and longer life from concrete flooring.

The Multi-Clean Method Fortifies These Floors against abrasion and the devastating effects of excessive water, grease, oils, alkali, soap and other chemicals, which formerly caused deterioration of the concrete in a short time.

Multi-Clean Concrete Preserver Provides a Tough, Sanitary Finish in a choice of five colors and neutral. It penetrates the pores, leaving a very thin surface film that is bound into the concrete. It does not chip or flake and worn spots are easily touched up without showing laps. It also provides an excellent base for Multi-Clean Anti-Slip Waterproof Floor Wax, which produces an attractive, long-lasting, resilient finish and affords easier floor cleaning.

How the Multi-Clean Method Applies to Concrete Floors, New or Old

Whether you have a new concrete floor or are refinishing an old one, the Multi-Clean Method is fast and economical. After the floor is properly etched and dried, two coats of Multi-Clean Concrete Floor Preserver are applied, allowing 8 to 16 hours between coats. If wax is applied it is buffed in with the Multi-Clean All-purpose Floor Machine and the floor is ready for service.

The Multi-Clean Method reduces maintenance time because sweeping is easier and more effective. Wet moppings become less frequent, but when they are necessary, heavy soilage comes up quickly and with very little effort. When preparing floors for application of Multi-Clean floor finishes, the floor machine is used as an effective floor scrubber. The Multi-Clean high performance Vacuum, companion tool to the floor machine is used as a quick and easy way for wet or dry pick-up of dust, dirt or scrubbing solution.

The MULTI-CLEAN Method for Every Type of Floor

It is a carefully planned, thoroughly tested and proved procedure developed by floor specialists. It combines the use of the right chemicals and equipment with the proper application for all types of floors.

FREE! Floor Maintenance MANUALS

Handy file size, each one dealing with the proper care for a specific type of floor. Check the coupon for manuals you desire.

MULTI-CLEAN®
PRODUCTS, INC.

MULTI-CLEAN PRODUCTS, INC.
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Gentlemen: Send me the maintenance manuals I have checked.

☐ Linoleum ☐ Asphalt Tile
☐ Terrazzo ☐ Rubber Tile
☐ Concrete ☐ Wood

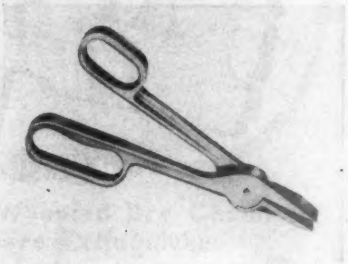
Name_____
Address_____
City_____ Zone____ State_____

Custom Cleaning Chemicals • Floor and Rug Machines • Permanent Floor Finishes • Industrial Vacuums

ating linkage is completely mechanical. There's no possibility of any sparks.

Two models provide either pushbutton or selector knob control. Designed for vertical panel mounting, switch is single pole with either double- or single-throw action. Pushbutton model is spring loaded to return switch to original position when released. Selector-type switch can be set in either "on" or "off" position.

Panalarm Products, Inc., 7212 No. Clark St., Chicago 26.



Magnesium Safety Tongs to Prevent Die Damage

Cast from a special magnesium alloy, Magline safety tongs will crush, if caught within the die opening, without damaging the die itself. Tongs weigh only 6 oz. They are said to permit easy 1-hand operation with minimum operator fatigue. Request to manufacturer will bring you their Bulletin ST-501, describing standard and special models.

Magline, Inc., Pinconning, Mich.

Pressurized Extinguisher for Metal Fires

The first pressurized extinguisher for hazardous metal fires is now ready to go to work on fires in magnesium, potassium, powdered aluminum, etc. The extinguishing agent, Ansul Met-L-X dry powder, fuses to form an air-excluding crust over the burning metal. Without oxygen, the fire is quickly snuffed. You can use the new Ansul extinguisher on any combustible metals whether liquid or solid.

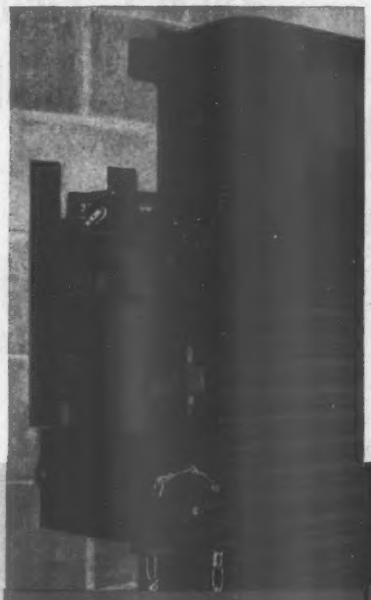
Met-L-X is moisture repellant, free-flowing, nontoxic, noncorrosive, and nonabrasive. It will not conduct electricity and does not deteriorate under normal conditions. Extinguishers are manufactured in 30-, 150-, and 300-lb. sizes. Larger units, including an automatic piped system, are also included in the Ansul line.

Ansul Chemical Co., Marinette, Wisconsin.

More on next page

Rolling Steel DOORS

Manually, Mechanically, or Power Operated



MAHON STANDARD
POWER OPERATOR 920-P

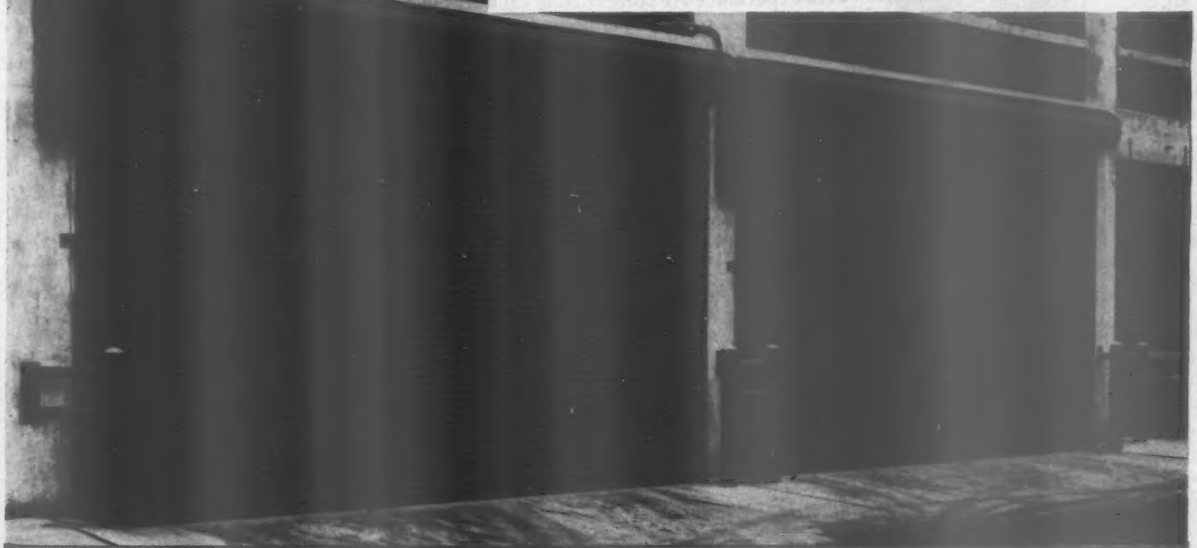
When selecting doors for industrial or commercial buildings, particularly for shipping openings, your first considerations should be economy of space, permanence and reliability . . . opening and closing speed is also important, not only because it affects heating costs, but from a standpoint of time-saving door efficiency in daily operation. The quick opening, quick closing rolling steel door provides all of these desirable features . . . open or closed it occupies no usable space inside or outside the opening . . . its all-metal construction provides permanence and maximum protection, and its simple vertical action assures a lifetime of continuous trouble-free service. If you buy Mahon Rolling Steel Doors, you can rest assured that you will get the finest materials, finest workmanship, and the latest developments in doors of this type. Comparison will convince you. See Sweet's Files for complete information including specifications, or write for Catalog G-50.

THE R. C. MAHON COMPANY

Detroit 34, Michigan • Western Sales Division, Chicago 4, Illinois

Representatives in all Principal Cities

Manufacturers of Rolling Steel Doors, Grilles, and Automatic Closing Underwriters Labeled Rolling Steel Doors and Fire Shutters; Insulated Metal Walls, Steel Deck for Roofs, Partitions, Acoustical Ceilings, and Permanent Concrete Floor Forms.



ROLLING STEEL DOORS, SHUTTERS AND GRILLES TO MEET EVERY REQUIREMENT

Typical Installation of Two Power Operated Mahon Rolling Steel Doors in two double-truck openings to an enclosed shipping dock. These doors are 22 Ft. x 14 Ft. and are operated by remote push-button controls.

MAHON

Fewer rejections . . . greater safety . . . better employee relations . . . increased efficiency to meet defense demands—these are the immediate returns on your investment in good industrial lighting.

Appleton Industrial Lighting Equipment is precision-designed to provide *good light*—the right light, without uncomfortable glare, troublesome contrast or shadow. Expert engineering, unequalled manufacturing facilities and a half century of experience are combined in each Appleton fixture to provide maximum efficiency at minimum installation, service and operating expense.

Appleton Lighting Fixtures are made to suit every industrial requirement—including hazardous locations—whether indoors or out. For the finest illuminating equipment or expert assistance on any lighting problem, contact Appleton—Standard for Better Lighting.

APPLETON LIGHTING EQUIPMENT

Sold Through Electrical Wholesalers

APPLETON ELECTRIC COMPANY

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APPLETON

CONDUIT FITTINGS • LIGHTING EQUIPMENT • OUTLET AND SWITCH BOXES • EXPLOSION-PROOF FITTINGS • REELITES

VALVES, PIPING & ACCESSORIES

Speedy Coupling for Liquid and Gas Lines

Less than a quarter turn opens or closes this two-piece self-positioning coupling. The unit is said to provide extended, leakproof service in liquid and gas lines due to the metal-to-metal locking arrangement of tapered lugs and flanges. The matched taper makes the coupling shock and vibration-resistant.

Gasket is protected at all times, and there are no threads exposed to damage. You can get special caps to protect lines from contamination when uncoupled. Standard couplings take up to 150 psi. pressure—high-pressure models can be obtained in excess of 2000 psi. Sizes range from ½ to 6 inches. Available in aluminum, high-test bronze, stainless steel, and Ni-Risist.

The Mead Cornell & Co., P.O. Box 2682, Cleveland 7, Ohio.

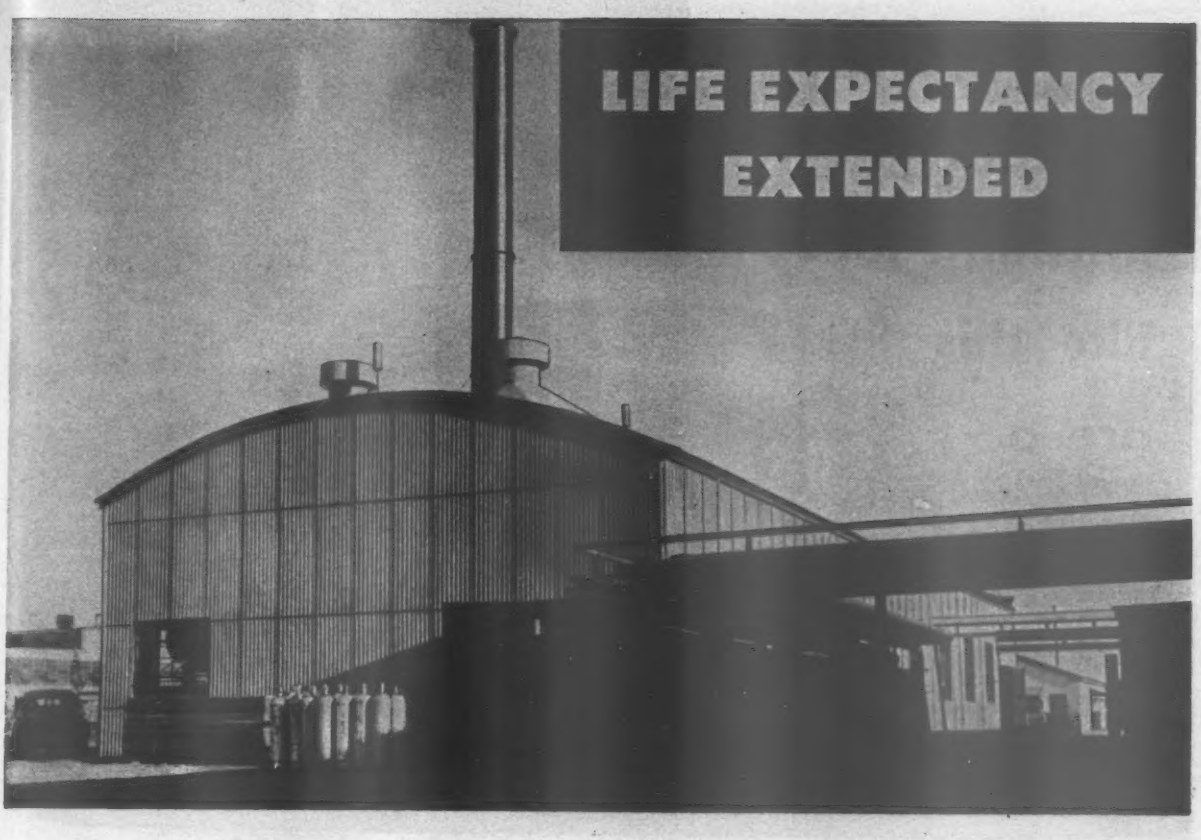
Hydraulic Unloading Valve

You use the Model 8826 unloading valve in hydraulic oil circuits to unload one part of the circuit to the tank at no back pressure. The valve is operated by pilot pressure from some other part of the circuit. Free flow back to the tank continues until the pilot pressure drops below the valve setting.

The Model 8826 comes in ¼- to 1½-in. sizes. You can get one with either of two pressure ranges—50-150 psi. and 500-1500 psi. Both ranges are fully adjustable from minimum to maximum. Full story is in maker's Catalog Section 202.

Rivett Lathe & Grinder, Inc., Brighton 35, Boston, Mass.

More on next page



by K&M "Century"®
ASBESTOS CORRUGATED

Compressor Room of the Birds Eye-Snider Plant at Walla Walla, Washington, is sided with K&M "Century" Asbestos Corrugated Sheets.

The sturdy "clean build" of these compressor plant walls is one sign they'll live long. They're K&M "Century" Asbestos Corrugated, the material you see on more and more industrial and commercial buildings whose owners have made sure of lasting good looks and economy.

K&M Corrugated saves from the start by simplifying and speeding erection. Cutting, drilling, fitting and anchoring are easily done, with every assurance of trim, durable enclosure. What's more, K&M Asbestos Corrugated Sheets—*stay put*. They don't give in to weather effects and fire hazard, nor to rust, rot, rodents and termites. Thus long-term freedom from maintenance goes right along with the initial economy of using K&M "Century" Asbestos Corrugated for siding and for roofs, too.

Whatever your building plans, see how much this adaptable modern material can save you. Write us for full data and the name of your nearest K&M Distributor.

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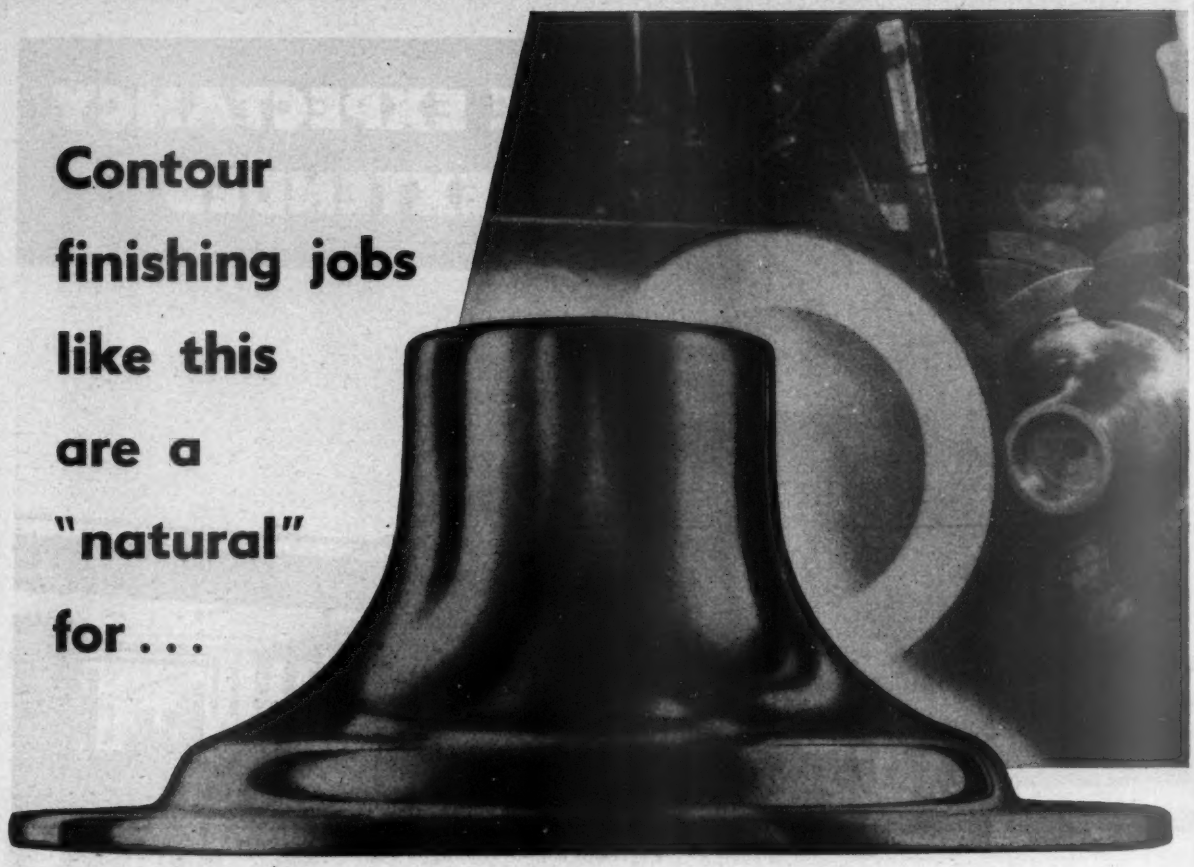

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Begins on page 132

MISCELLANEOUS

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More on page 322

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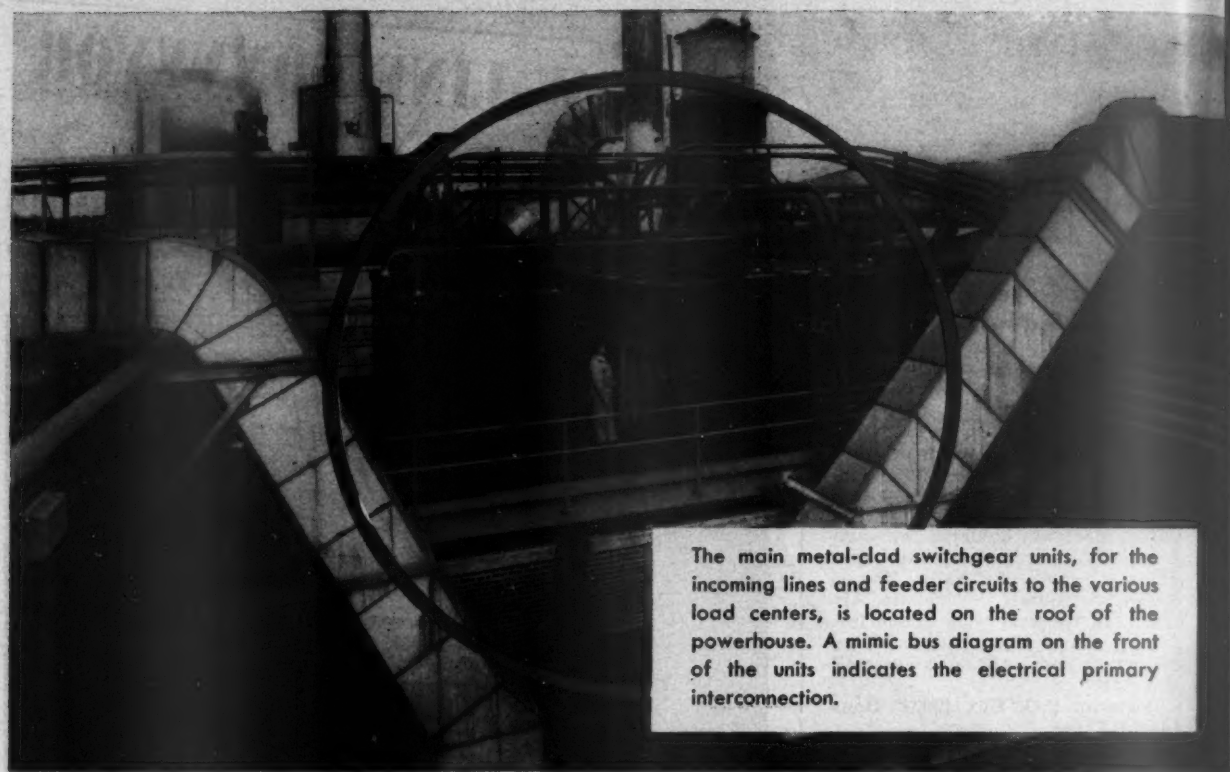


The main metal-clad switchgear units, for the incoming lines and feeder circuits to the various load centers, is located on the roof of the powerhouse. A mimic bus diagram on the front of the units indicates the electrical primary interconnection.

PUTS SWITCHGEAR ON ROOF

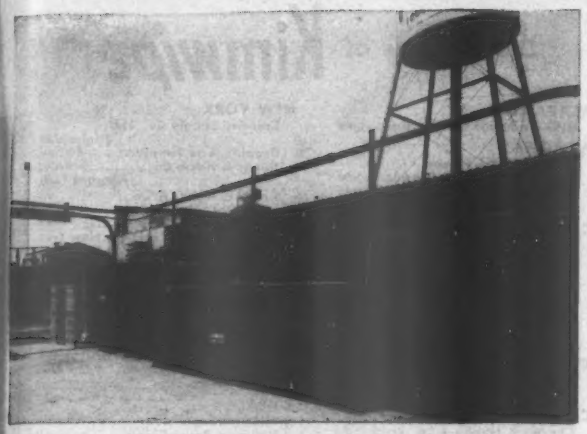
saves 10,000 sq. ft. of floor space

Indoor space limited—installation made with almost no interruption of production —Maintenance will be greatly simplified.

When Scott Paper Company, of Chester, Penna., completely revamped its electrical system to take care of expanded plant output, it made one rather unusual decision. Because indoor space was limited, it put all its switchgear and load-center units on the roofs of the various buildings. The incoming utility power lines, at 13,200 volts, terminate in General Electric outdoor metal-clad switchgear on the roof of the powerhouse, and the 575-volt distribution system is fed through G-E metal-enclosed gear located on roofs of the individual buildings. Distribution between buildings is at 13,200 volts with step-down load-center units.

This type of installation has proved to have a number of advantages. In the case of Scott Paper, 10,000 square feet of badly needed floor space became available for paper making. The entire installation could be made during normal working hours, yet did not interfere with plant production. Likewise, routine inspection and maintenance can be done without entering the manufacturing areas. All breakers are of the easily-removable type that is so easy to maintain and inspect.

What's more, there's plenty of space for expansion. Provision has been made to double the capacity—by adding transformers and switchgear—when still more electric power is needed later. ***Apparatus Department, General Electric Company, Schenectady 5, N. Y.***



A double ended load-center unit feeding the large 2300-volt motors in one of the main buildings. Unit consists of two power transformers with air-interrupter disconnects, and metal-clad switchgear units for metering and for the four magne-blast air circuit breakers.

One of several single-ended load centers, which can be doubled in capacity later by adding a second transformer and low-voltage switchgear units. This particular unit uses metal-enclosed gear with draw-out air breakers to 575-volt feeders which serve the paper finishing units.

New switchboards simplify control — Increase safety

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AFTER Main switchboard is now simply a control board. Incoming line and feeder circuits can all be closed from this one location. No power lines or high voltage is brought to this board at all—and there are no open buses or switches to form a hazard to personnel.

854-33

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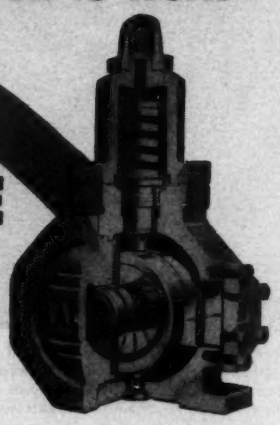

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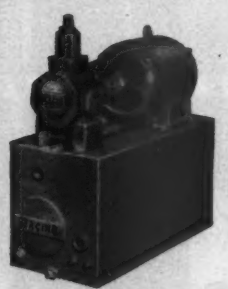

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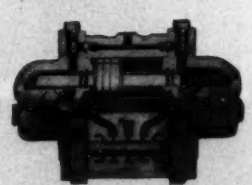

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SIGNIFICANT LABOR DEVELOPMENTS

. . . told in brief for busy factory executives

By **PAUL A. KING**, *Assistant to Vice President for Personnel, Bigelow-Sanford Carpet Company, Inc. Member, New York Bar.*

NONCOMPLIANCE WITH NON-COMMUNIST OATH NO EXCUSE. *NLRB overturns longstanding rule that you need not bargain if union officers don't sign non-Communist affidavits* . . **Page 190**

BARGAINING WAIVERS MUST BE SPELLED OUT CLEARLY. *If the union gives you the right to act by yourself on a collective bargaining matter, be sure your contract spells that right out clearly* . . . . . **Page 192**

NLRB TURNS OVER EMPLOYER'S WAGE SURVEYS TO UNION. *The Board has already ruled that you must give the union your own wage data. Now you must give it to competitors also, says an NLRB trial examiner* . . . . . **Page 194**

MASS ILLNESS FALLS WITHIN NO-STRIKE CLAUSE BAN. *The popular 1950 union strike cover-up of having workers report ill didn't fool this arbitrator* . . . . . **Page 194**

PRIME CONTRACTORS WHO SUBCONTRACT CAN'T DUCK WALSH-HEALEY LIABILITY. *The law is clear. The prime contractor is liable for violations by the subcontractor* . . . . . **Page 197**

FOREMEN STILL HAVE SOME LABOR LAW PROTECTION. *The Taft-Hartley Act seemed to say no. But as a practical matter, foremen are given some protection* . . . . . **Page 197**

BRIEF BUT IMPORTANT. *Manpower one of ten defense contract considerations . . . Tough to find job applicants? . . . Women are "too old at 35" . . . Chemical industry operates under highest wage minimum ever set . . . Employees posted on checkoff rights . . . Lest you've been forgetting . . . Gary, Ind., joins city anti-discrimination parade.* . . . . . **Page 198**

Noncompliance With Non-Communist Oath No Excuse

Ever since the Taft-Hartley law was passed more than three years ago employers have believed they didn't have to bargain with a union whose officers had not signed non-Communist affidavits.

This belief became the rule of the NLRB a year ago. In a close 3-2 decision, the Board then decided that Andrews Co., Spartansburg, S. C., did not have to bargain with an AFL union not in compliance with Taft-Hartley at the time it sought to bargain.

This is now changed. By another 3-2 decision, the Board has reversed itself to this extent: noncompliance by the union is no defense for an employer's refusal to bargain—*unless* the employer gave that as the reason at the time he refused.

The decision was handed down against New Jersey Carpet Mills, Inc., Englishtown, N. J. The situation was this: The CIO Textile Workers sought recognition from the company in September, 1947. Non-Communist affidavits were not filed until late in October. The company at first ignored the union's demand for recognition, then asked it to get certification from NLRB. Meanwhile, the company began questioning employees about the union, talked against the union, and discharged one worker.

The Board found that the union actually did represent a majority of the employees. Also that the company, in refusing to recognize the union, was motivated by a desire to destroy the union's majority status rather than by a good-faith doubt of the union's position. The decision was unanimous on this point.

The Board was unanimous, also, in the view that New Jersey Carpet Mills should have bargained with the union after it was in compliance. It ordered the company to bargain in good faith, stop discharging workers for membership in the CIO union, and reinstate a discharged employee with back pay.

The split in the Board was on the company's position before the union's compliance. There was no change of view on the part of the four members who participated in the Andrews decision a year ago. The switch occurred by reason of the replacement of J. Copeland Gray with Paul L. Styles earlier this year.

Gray, James J. Reynolds, Jr., and Abe Murdock comprised the majority in the Andrews case, with Chairman Paul M. Herzog and John M. Houston dissenting. Styles, the new member, swung the decision.

Today's majority holds in the New Jersey Carpet Mills decision that a union's failure to comply with non-Communist affidavit rules still limits any action the Board may take. The Board still may not hold a bargaining election or union shop election. And it may not certify unfair labor practices in behalf

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SIGNIFICANT LABOR DEVELOPMENTS

Begins on page 190

of such a union. But that's the Board's business—not the concern of the employer.

In support of this position, the majority cited a recent opinion of the U. S. Court of Appeals in the West Texas Utilities Co. case. The court said: "We do not think an employer may take the matter into his own hands and refuse to bargain with a union because its officers have not filed [affidavits] . . . it is thus the Board which refuses its process to the noncomplying union, not the employer."

The court also said it disagreed with the Board's earlier policy expressed in the Andrews decision.

The majority of the Board left unclear where the employer stood under the Taft-Hartley law if he refused to bargain because of noncompliance by the union and at the same time gave that as his reason. Board Chairman Herzog, in a separate opinion, said he would uphold the employer in such a situation. But his two majority colleagues did not commit themselves. They would decide such a "hypothetical situation" when it came before them for decision, they said.

The minority — Reynolds and Murdock—charged that the new policy could be used by Communist union leaders to control a union. They said:

"During the period of their compliance, Communist labor leaders may as majority representatives request an employer to bargain, confident that if the request is refused, at a propitious moment which may well be after a defection of employees from the union's ranks they may perpetuate themselves in their union leadership . . . by belated compliance and recourse to the Board."

Bargaining Waivers Must Be Spelled Out Clearly

Here's a Number One rule for successful labor negotiation: If the union agrees to permit you to do what you wish about a matter which is ordinarily subject to collective bargaining, *spell this agreement out clearly.* The NLRB is strict about not enforcing provisions of this kind if they are vague.

For example, the contract of the Standard Oil Co. of Toledo with the Oil Workers reads:

"The employer shall not discriminate against employees . . . with

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SIGNIFICANT LABOR DEVELOPMENTS

Begins on page 190

with regard to participation in benefits or bonuses provided."

The company argued that this was intended as a waiver of the union's right to bargain on group insurance. The NLRB disagreed. It ruled that this was not "a clear and unmistakable showing of a waiver" by the union to bargain on group insurance.

NLRB Turns Over Employer's Wage Surveys to Union

Watch out if you refer to the wages paid by your competitors as a reason for not giving a union a wage increase. You may have to show the union the wage survey upon which your refusal was based. An NLRB trial examiner ordered the Westinghouse Electric Co. to do this. The examiner felt that his ruling was in line with Board decisions entitling the union to information from the employer that it needed to carry on intelligent bargaining.

Mass Illness Falls Within No-Strike Clause Ban

1950 disease rate statistics will take a beating if you add to them the number of hours lost due to "illnesses" caused by no-strike clauses. To avoid running up against the no-strike provisions of the contract, a popular tactic has been for workers to get suddenly sick—masses of them—and go home or not report in.

A recent example of this occurred in the Wallingford, Conn., plant of the American Cyanamid Co. After a morning union meeting on company time and property (company consenting) 20 of the workers went home instead of going back to work. They called up to report that illness prevented them from returning that afternoon.

The company imposed the penalties called for by the no-strike clause of the union contract. Maxwell Copeloff, who was later called in to arbitrate the case, found that "the absence of the 20 workers was not due to a coincidence." They weren't all ill. The company, he ruled, was justified in imposing the penalty provided by the no-strike clause.

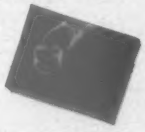
A "New Dimension" in Entertainment served by Georgia-Pacific

HERE'S THAT MOON WITH A FENCE AROUND IT!

Ours is a generation that reached for the moon, and got it! Television, striding ahead at the rate of 500,000 sets a month, is bringing new thrills to young and old . . . again making home the center of entertainment.

And when television came, Georgia-Pacific helped to put the "fence" around that moon. At Philco, famous name in television, for example, Georgia-Pacific plywoods are used for luxuriously grained cabinets and tough supporting structures inside. Providing special wood products for better industrial use is just one of the benefits of Georgia-Pacific's "new dimension" in plywood, lumber and door buying. From strategically located mills and warehouses, Georgia-Pacific offers every type, species and grade of plywood and lumber you need, quality controlled every step of the way from the forest to your factory or yard.

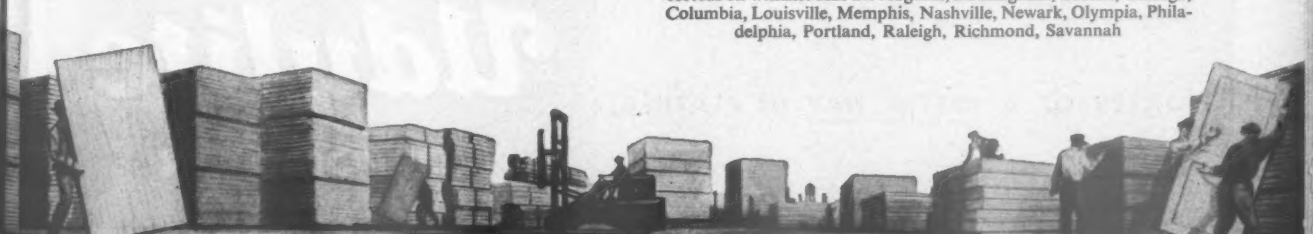
BUSINESS EXECUTIVES—*For a modern approach to plywood and lumber buying, write on your company letterhead for a copy of this 20-page, full color booklet—A "New Dimension," Georgia-Pacific Plywood & Lumber Company, 610 N. Capitol Way, Olympia, Wash.*



GEORGIA—PACIFIC

PLYWOOD & LUMBER CO.

OFFICES OR WAREHOUSES IN: Augusta, Birmingham, Boston, Chicago, Columbia, Louisville, Memphis, Nashville, Newark, Olympia, Philadelphia, Portland, Raleigh, Richmond, Savannah



DOUGLAS FIR PLYWOOD • HARDWOOD PLYWOOD • SPX • SOUTHERN & WESTERN LUMBER • DOORS

This Udylite Full Automatic Plating Machine is used at Underwood's Hartford Works to plate small parts for the Underwood Electric Typewriter.

Another great name in American Industry—the Underwood Corporation—has found Udylite equipment and processes supply a ready answer to plating problems. Underwood reports—since installation of their new Udylite Full Automatic Plating Machine for Bright-Nickel application to typewriter parts—that rejects have been virtually eliminated and hand buffing operations on many small parts are now no longer required. This is in addition to a substantial saving in manpower over their previous equipment.

The Udylite Full Automatic offers: (1) Modern, simplified design for easy maintenance; (2) Rugged, integrated frame and base for rapid installation and long-lived durability; (3) Hydraulic lift and transfer mechanism for smooth, efficient operation; (4) Independent lift and transfer controls for meeting various plating requirements.

These and many other advantages have made Udylite equipment the first choice of platers everywhere. Let your Udylite Technical Man show you how Udylite methods and machines can bring tangible benefits to your plating operations. Call him in today. There's no obligation. Or write direct to *The Udylite Corporation, Detroit 11, Michigan.*

PIONEER OF A BETTER WAY IN PLATING

THE Udylite CORPORATION
DETROIT 11, MICHIGAN

SIGNIFICANT LABOR DEVELOPMENTS

Begins on page 190

Prime Contractors Who Subcontract Can't Duck Walsh-Healey Liability

As a prime contractor of government work, it's up to you to live up to the provisions of the Public Contracts Act (Walsh-Healey).

You do not duck this responsibility when you subcontract all or part of the contract.

A case recently heard by Public Contracts Division of the Department of Labor made this absolutely clear. The hearing examiner pointed out that the Act left no doubt about it and for good measure indicated that elementary contract law came to the same conclusions as the Act.

So, if you are contracting out government work be sure the subcontractor is familiar with the Public Contracts Act—and lives up to it. (*RE: US Soap*).

Foremen Still Have Some Labor Law Protection

The 1947 Taft-Hartley Act said that foremen are not to be considered "employees" under the Labor Relations Law. This might have meant that they were to be deprived of the protection that law offered employees. But Salant and Salant, Inc., of Lexington, Tenn., learned from the NLRB that as a practical matter, foremen have not lost *all* protection under the law.

The Tennessee company "laid off" a foreman "temporarily." Material shortages and a reduced volume of orders and production were the reasons. But the foreman had been on the payroll for 14 years. And several months after his layoff an inexperienced foreman in the plant was trained to do his job.

The NLRB looked at the facts and found that the foreman was fired, not laid off. He was fired, it ruled, because he refused to line up his subordinates for a rival AFL union, and otherwise help defeat the CIO—which was organizing at the time.

The Board ordered the company to reinstate the foreman—not because he was covered by the labor relations law—but because his discharge constituted "an invasion of the rights guaranteed to nonsupervisory employees."

"Grigsby's been awful hard to throw since he lined the seat of his pants with slip-resistant 4-WAY Safety Plate."

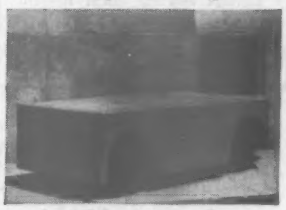
For greater safety under foot,
in your plant and on your products

Inland 4-Way® Safety Plate

Safe Footing

Easy Cleaning

Firesafe



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INLAND

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38 So. Dearborn St., Chicago 3, Ill.
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New Bulletin with New Ideas—Just Out! Bulletin F1. Complete engineering and application data. Send for it!

STOCKED BY LEADING STEEL WAREHOUSES

PRODUCT OF OKLAHOMA

...TECHNICIANS for Your Southwestern Plant

Nowhere in the nation will you find such outstanding educational work being done to train men for industry as you find in Oklahoma.

- *Air Conditioning and Refrigeration*
- *Building Construction*
- *Machine Drafting and Design*
- *Diesel and Stationary Engines*
- *Electrical Technician*
- *Fire Protection*
- *Automobile Repair and Service Management*
- *Radio and Electronics*

Technical training courses for industry at Oklahoma A&M College and the A&M Branch at Okmulgee have professional and crafts organization approval.

Two schools of technical training are operated by the Oklahoma A&M College—one at Stillwater on the college level, the other at Okmulgee on the trade level—both providing trained personnel required by the industrial development of the state. Enrollment at these schools totals more than 2,000. Specialized practical training is given in both one and two year courses to equip men for immediate factory employment.

If your company is contemplating branch operations in the Southwest, Oklahoma has the men you will need.

WRITE for detailed information with the assurance your inquiry will be held strictly confidential.

IN THE SOUTHWEST YOU CAN DO BUSINESS BETTER FROM THE CENTER

OKLAHOMA

PLANNING and RESOURCES BOARD
STATE CAPITOL BUILDING
OKLAHOMA CITY, OKLAHOMA

SIGNIFICANT LABOR DEVELOPMENTS

Begins on page 190

BRIEF — BUT IMPORTANT

Manpower is one of ten defense contract considerations. Secretary of Defense Marshall issued instructions including availability of manpower as one of the ten points to consider in negotiating defense contracts.

Tough to find job applicants? Many employers who had forsaken their state employment offices in the past five years are finding it profitable to dust off their relationships there. State employment agencies are tied up with state unemployment offices, know who is unemployed. They can refer them to you if you request aid.

Women are "too old at 35." Frieda S. Miller, Director of the U. S. Women's Bureau, told this to the New York State Joint Legislative Committee on Problems of the Aging at a hearing on December 14. That is the excuse women often come up against when looking for a job. This is in contrast with the "too old at 45" approach given men job seekers.

The chemical industry is operating under the highest wage minimum ever set under the Public Contracts Act (Walsh-Healey). It's $1.40 per hour for the bone black, carbon black, and lamp black branch of the industry.

Employees posted on checkoff rights. A contract clause gives employer Landers, Frary & Clark of New Britain, Conn., the right "to post on bulletin boards or otherwise distribute a notice to employees calling attention to their rights" of cancelling checkoff authorizations at the end of each contract year. The union is the United Electrical, Radio & Machine Workers of America.

Lest you've been forgetting— American employers of U. S. citizens working out of the States must deduct the 1½% Social Security Tax from their pay—and must match the amount.

Gary, Ind., joins city anti-discrimination parade. It adds age to the list of discriminatory acts banned by such ordnances. Other cities with such laws: Youngstown, Ohio; Philadelphia, Pa.; Minneapolis, Minn.; Chicago, Ill:; Milwaukee, Wis.

Gardner-Denver WB Vertical Water-Cooled Compressor.

"That sign's been up seven years already!"

A Gardner-Denver WB Compressor like this was installed in a midwestern plant seven years ago. It has never been touched since—except to change the oil and take up on the water pump packing. The valves have never been examined—even though the compressor saw 24-hour service much of the time.

Your **maintenance men can keep "hands off," too, when you choose a Gardner-Denver WB Air Compressor. And a WB saves space as well as maintenance dollars—gives you big air capacity and high efficiency from a small corner of your plant.**

Gardner-Denver WB Compressors are available with water tube intercooler, as shown, or with self-contained radiator intercooler for use where good cooling water is scarce. Send today for bulletin WB-10.

SINCE 1859

GARDNER-DENVER

Gardner-Denver Company, Quincy, Illinois

In Canada: Gardner-Denver Company (Canada), Ltd., Toronto, Ontario

THE QUALITY LEADER IN PUMPS, COMPRESSORS AND ROCK DRILLS

THOUSANDS OF PLANTS

Switch to FOSTORIA INFRA-RED

Most efficient of all industrial ovens for finish baking and other heat applications

Typical of thousands of Fostoria installations replacing former heating or drying methods is the Infra-red oven at Automatic Burner Corp., of Chicago used for finish baking oil and gas burners. Here the light weight Fostoria oven is suspended from the ceiling, saving considerable floor space. The conveyorized system saves much handling. 350 units are now turned out in 8 hours compared with 150 units previously, and finishes are more durable and attractive. No heating up time is required — production is instantaneous with complete flexibility of control.

Throughout industry, new high standards of production efficiency are being set by utilization of the Fostoria Infra-red System. Savings in "per piece" production cost are substantial with many additional advantages on both large and small operations. Whatever your baking, drying, degreasing, or industrial heating problems may be, investigate the high efficiency of Infra-red ovens as engineered by Fostoria. Case histories of installations applicable to your production are available on request.

SAVES SPACE

Fostoria Infra-red ovens operate on a comparatively short cycle which results in smaller oven requirements. They may also be suspended from ceiling mounts to eliminate floor space entirely.

SAVES TIME

Reduces processing time from hours to minutes because of the inherent speed of Infra-red. There is no time lag in starting an oven, the heat is instantaneous.

SAVES MANPOWER—MANHOURS

Ideal for conveyorized production methods. Reduces excessive product handling. Turns out more pieces per day with ease, with less people.

CUTS COSTS

Faster production, lower operating costs, improved quality, result in lowest "per piece" cost.

GET THE FACTS ON FOSTORIA "KNOW HOW" HELP TO REDUCE YOUR "PER PIECE" PRODUCTION COST

Write, today, for this factual information on this Infra-red process and equipment as engineered by Fostoria. Technical data applicable to your operations will be included if you send us general facts about your particular problem. A Fostoria representative will gladly analyze your production needs and submit definite recommendations and carefully forecasted results for your consideration.

THE FOSTORIA PRESSED STEEL CORPORATION
FOSTORIA, OHIO
Oldest and Largest Manufacturers of Industrial Infra-red Ovens

INFRA-RED fostoria SYSTEM

MAINTENANCE POINTERS

Begins on page 124

WAYS TO SOLVE PLANT ENGINEERING PROBLEMS

IS CONDENSATION DRIP WETTING YOU DOWN?: One cure, claims Republic Powdered Metals, Inc., Cleveland 11, is its "Alumanation NCD." You trowel or brush it on pipes, tanks, or walls. It's a waterproof heat insulator, elastic but tough.

A PRIMER ON INDUSTRIAL TEMPERATURE CONTROL: You don't need to know a thing about the subject to start reading this free 23-page manual, "Industrial Temperature Measurement and Control." Yet it's an education for the veteran heating engineer as well as the novice. A fine reference piece, from The Partlow Corp., New Hartford, N. Y.

WHY PAY FOR AN AUTOMATIC SPRINKLER SYSTEM?: Because you can't lick the statistics on whose pocketbook gets burned to a crisp when a plant has a fire. For vivid proof, ask the National Automatic Sprinkler and Fire Control Assn., 205 E. 42 St., New York 17, for its free booklet on "The Automatic Sprinkler System."

ANOTHER PUNCH AT THAT 'OLE DEBBIL' CORROSION: This time it's battery acid corrosion. The punch is a chemical paint called "Sheeld." You brush it on the battery, carrier, hold-down terminals, and cable ends. Newman Associates, Inc., 318 Cadiz St., Dallas, Tex., claims it banishes corrosion for years.

EENY, MEENY, MINEY, MO—WHICH BELLOWS?: Engineers of Clifford Mfg. Co., Waltham 54, Mass., contracted to take the guesswork out of this problem. Then they expanded at length in "What to Consider When Selecting Metallic Bellows."

FUMES FROM GAS TRUCKS GOT YOU REELING?: Oxy-Catalyst Mfg. Co., Inc., Wayne, Pa., has answered this problem with an exhaust attachment that's easy to install. It says that users of nonleaded gasoline fuel will get a nonpoisonous and odorless exhaust. Descriptive bulletin available.

PAYLOADERS Can Help You Too

EVERY industry with loose or bulk materials to handle is buying Hough PAYLOADERS because these husky, unit-design tractor-shovels are a sure, proven way to lick rising costs, solve manpower shortages and increase output.

A PAYLOADER more than pays its way every day — actually pays for itself within a few months doing the many jobs listed here and doing them faster and cheaper . . . releasing manpower for more productive work.

The 12 cubic foot Model HA shown is the smallest of the PAYLOADER line that includes graduated sizes up to 1½ cubic yard bucket capacity. Every PAYLOADER is a complete, Hough-built tractor-shovel specifically designed with multiple reverse speeds and other features that insure fast, low-cost bulk material handling. They are backed by 30 years of material-handling equipment manufacture and are sold and serviced by a world-wide Distributor organization. The Frank G. Hough Co., 755 Sunnyside Ave., Libertyville, Ill.

Literature on any size PAYLOADER will gladly be sent without obligation.

On These Jobs

- Unload box cars
- Dig and carry all kinds of bulk and loose materials
- Feed conveyors, hoppers elevators, baggers
- Unload trucks
- Load box cars
- Carry bagged and baled materials
- Clean up aisles, gangways
- Maintain private roadways
- Handle coal, coke, ashes
- Stockpile coal and materials
- Remove snow
- Lift-pull-push

SAY HUFF

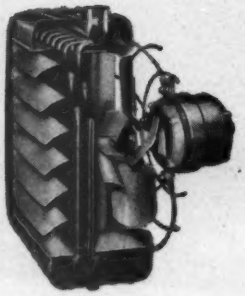
PAYLOADER®

THE FRANK G. HOUGH CO. • Since 1920

It pays to look for these qualities when selecting Unit Heaters

SIGHT FOR STYLING

You'll like smart, functional Modine styling—the achievement of one of America's standout industrial designers. Modines' truly good-looking lines complement any interior.

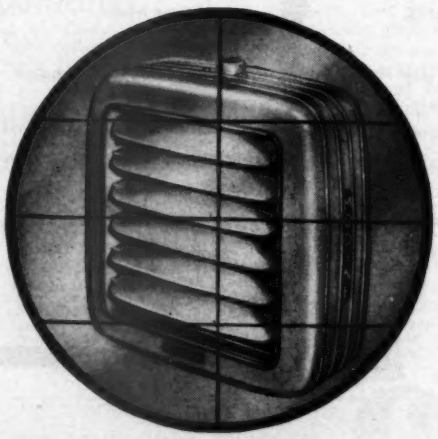


SIGHT FOR CONSTRUCTION

Smart-looking, yes... and mighty rugged, too! Modines are well-known for their long years of dependable, trouble-free service. Steam and water carrying passages are copper and copper alloy to resist corrosion. All joints are brazed. Tubes and headers are cylindrical—are brazed at the joints to withstand greater pressure. Parker-Bonderized casings are rust-resistant.

SIGHT FOR PERFORMANCE

Horizontal, Vertical **or** ***Power Throw*** **... any Modine model gives you outstanding, year-in year-out performance. Thanks to expert engineering, Modines assure you the correct outlet air temperature and the right air velocity for uniform comfort. Economical to operate, too!**



For Magnified Value... always select Modine Unit Heaters!

Yes, for styling, construction and performance, depend on Modines for *big value* all the way! In factories, stores, hundreds of other locations — Modine Unit Heaters excel in efficient, low-cost service. Get all the facts from your nearest Modine representative. He's listed in the classified section of your phone book. Or write direct, Modine Mfg. Co., 1505 Dekoven Ave., Racine, Wis.

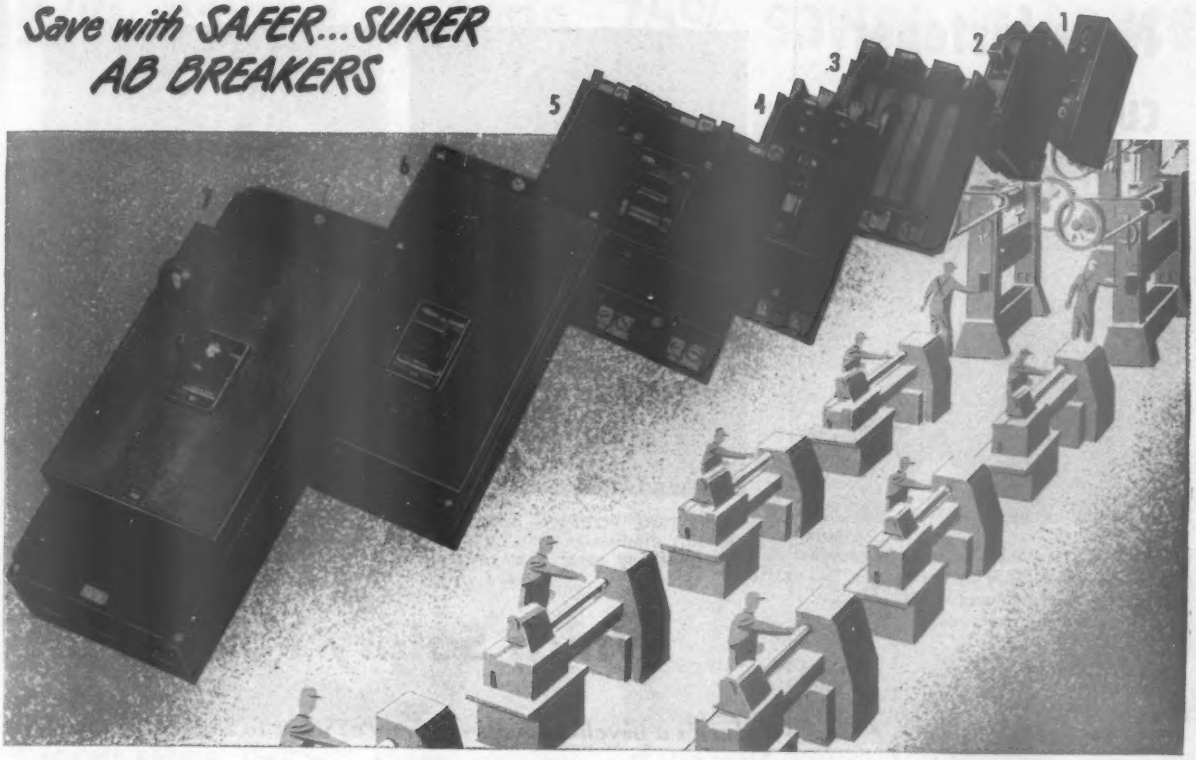
Ask for Modine Unit Heater Bulletin 149A. Also available—bulletins covering special applications in commercial brooder houses, greenhouses and milk houses.

U-1092

Modine UNIT HEATERS

MODINE UNIT HEATERS FOR FACTORIES • STORES • GREENHOUSES • COMMERCIAL BROODER HOUSES • MANY OTHER APPLICATIONS

Save with SAFER... SURER AB BREAKERS



A FULL LINE OF PROTECTION for full production lines

Power outages are doubly punishing when production lines are loaded. Today, lost production means longer deliveries; idle men and machines add to already fast rising costs.

Westinghouse Circuit Breakers help you minimize down time, and offer you completely reliable control and protection for every lighting and power requirement and for circuits that serve them. Westinghouse Breakers trip instantly on short circuits, yet ride out temporary, harmless peaks. And to get you off to a flying start again when trouble on the circuit is cleared, simply flip the breaker handle. No replacements, no chasing after fuses, no costly maintenance time in restoring power.

For assistance on any circuit protection problem, contact your nearest Westinghouse representative, or write for bulletin No. DB29-060, Westinghouse Electric Corporation, Box 868, Pittsburgh 30, Pennsylvania. J-30047

THE AB CIRCUIT BREAKER LINE IS THE COMPLETE LINE—RANGE 5 TO 600 AMPERES

1. **P-1**—single pole; for applications where excessive vibration or shock is prevalent; 10-15 amperes.
2. **QUICKLAG®**—single pole; provides maximum protection for small-wire general lighting and branch circuits; 10-15 amperes.
3. **E FRAME**—1 to 3 pole; thermal trip type; for motors, lighting and other applications where time-delay is required; 5-70 amperes.
4. **F FRAME**—2 or 3 pole; thermal-magnetic trip type; 10-100 amperes.
5. **G FRAME**—2 or 3 pole; particularly adapted to severe operating conditions in heavy industry; 40-100 amperes.
6. **K FRAME**—2 or 3 pole; universal service power breaker; 70-225 amperes.
7. **L FRAME**—2 or 3 pole; primarily for main distribution feeders in central stations, industrial plants, commercial buildings; 125-600 amperes.

DESIGN TESTED AND VERIFIED IN THE Westinghouse HIGH POWER LABORATORY

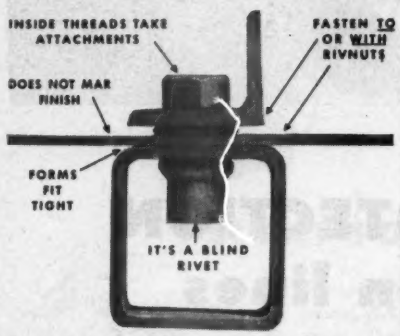
YOU CAN BE SURE ... IF IT'S Westinghouse

AB CIRCUIT BREAKERS

THE COMPLETE LINE

New fastener cuts assembly costs

RIVNUTS—the only one-piece blind rivet with threads—can be installed by one man in two seconds with an easy-to-use tool. Man-hours of assembly work are greatly reduced.



THIS FASTENER serves as a blind rivet—for hard-to-reach places where ordinary fasteners won't work. And it has six inside threads for attaching additional parts with screws. Fasten *to* it, *with* it, or both!

SEND FOR FREE DEMONSTRATOR

Chances are, Rivnuts can cut production costs and improve product quality for *you*. Send now for a free Rivnut demonstrator that shows with motion how Rivnuts work. Clip coupon below or write to *The B. F. Goodrich Company, Dept. F-21, Akron, Ohio.*

B.F.Goodrich

RIVNUTS

THE ONLY ONE-PIECE BLIND RIVET WITH THREADS

The B.F. Goodrich Co., Dept. F-21, Akron, O.

Please send me a free Rivnut demonstrator.

NAME_____

TITLE_____

COMPANY_____

ADDRESS_____

MISERY-TYPE POSTERS have one advantage: they arouse plenty of attention. But they emphasize fear and produce unpleasant reactions. They also deal with relatively rare types of accidents.

Which Safety Poster?

Here's a psychologist's analysis of what to look for in safety posters. His evaluation will help to guide you in picking the kind of poster that will help your safety program most.

By ALBERT A. CANFIELD
Department of Psychology
Northwestern University, Evanston, Ill.

THE SAFETY POSTER is but one of the many effective methods used to improve plant safety. It is obviously a training device—aimed at developing in workers a sort of safety-mindedness, or "safe way of behaving."

In this sense, the safety poster is a form of communication between employer and employee. To be effective, it must do three jobs.

1. It must get attention. If it isn't even noticed, nothing else matters.

2. It must be understandable. That is, it must be pitched at a level well within the comprehension of all those who will read or see it. A good poster should be simple, clear, and to the point.

3. It must be applicable. In other words, the poster should deal with subjects that the worker can and should do something about. Even the best poster on safety shoes is of no value in an office of clerks and stenographers.

Once a poster satisfies these requirements, it is ready to go to work. Then the question becomes: *Does it do what we want it to do?*

Research on the effects of various types of posters is particularly scarce. The results of one study showed that accidents decreased sharply in a 60-day period following the adoption of a new type of poster along with other changes in the safety program.

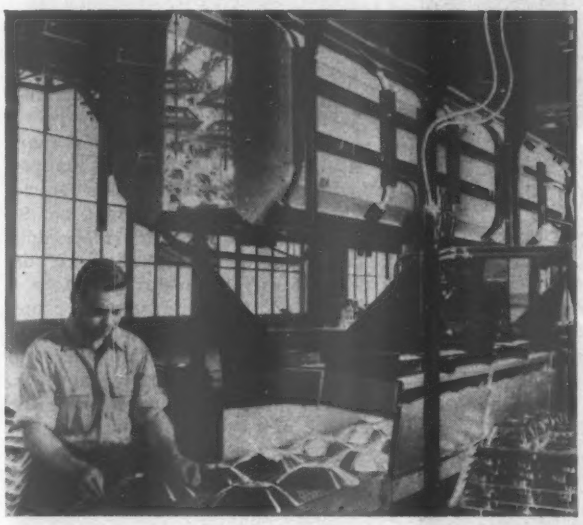
But the study does not give data for an extended period of time. This is regrettable because such reductions may be merely temporary. The results might be due to the increased emphasis put on safety in the plant, rather than to the specific devices (such as new posters) that the company has adopted.

Because of the lack of research information, this analysis deals with the psychological pros and cons of the three main types of safety posters currently in use. How desirable are these types—in terms of known psychological principles of training and learning?

1 · The Misery Poster

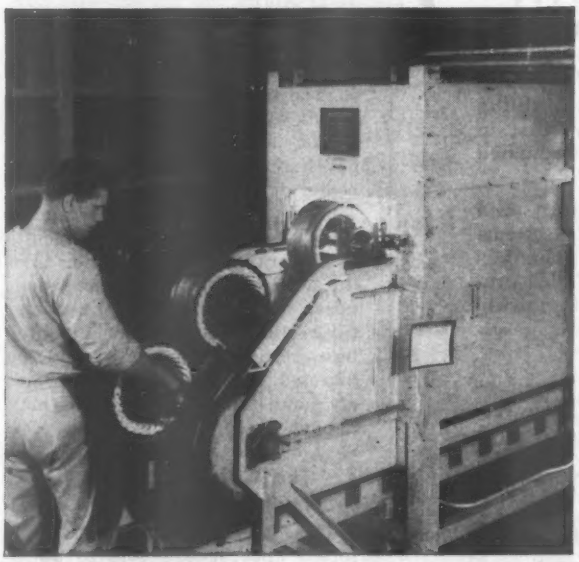
The dire consequences of accidents are emphasized in "misery" posters. They aim to make the

87% saving in time, 75% saving in space reported for G-E infrared lamps



1 QUICKER BAKING. The Phil R. Hinkley Company of Cleveland reduced baking time 87 per cent by using General Electric infrared lamps in the two ovens shown here. G-E infrared gives you quick heat at low cost—can save you time and money in a wide range of finishing, dehydrating, and drying applications.

2 LESS SPACE. Infrared ovens are compact, require less floor space and are easy to install overhead and out of the way. Many manufacturers report savings in space up to 75%. If you need room to expand, or have crowded finishing areas, General Electric infrared lamps can save you space . . . and money.



3 CLOSER CONTROL, TOO! If you have a tricky process that demands just the right amount of heat, General Electric infrared lamps may be your answer. You'll get clean heat that can be automatically controlled within narrow limits. G-E infrared assures the dependable heating necessary to maintain product uniformity . . . hold rejects—and costs—to a minimum.

General Electric makes a complete line of infrared lamps—125 to 1000 watts, both clear and reflector types. For more information, write General Electric, Div. 166-*FM*-2, Nela Park, Cleveland 12, Ohio.

FREE BOOKLETS ON INFRARED

"Bake-Dry-Heat with G-E Infrared Lamps." Gives advantages of infrared heating.

"Industrial Infrared Lamps". Where and how to use them.

For your free copies, write General Electric, Div. 166-FM-2, Nela Park, Cleveland 12, Ohio.

GENERAL ELECTRIC

Ever New Plant Efficiency from Imagination, Experience, Skill...

How 50 Years of *Engineering*

"PLANT-WIDE TRANSPORTATION"

CAN SPEED YOUR PRODUCTION...

SINCE 1901, when conveyor systems *engineered* by The Alvey-Ferguson Co. began to speed production in the handling of materials and products, Alvey-Ferguson has been "first in the field" as pioneer and developer of completely co-ordinated plant-wide indoor transportation systems.

Today, as we enter a new decade of ever-increasing speed and efficiency, more and more A-F *engineered* conveyor systems are moving the goods of many of America's foremost manufacturers. Additional scores of efficiency and economy-minded producers are planning to supply their consumers more quickly and at lower cost via the completely co-ordinated conveyor systems engineered by A-F.

Whatever your materials-handling or products- handling problem, A-F Conveyor Engineers can help you solve it. Their record of achievement is 50 years long. Won't you write—today?

THE ALVEY FERGUSON COMPANY

Offices in Principal Cities

132 Disney Street — Cincinnati 9, Ohio

CONVEYING EQUIPMENT

Alvey-Ferguson

WASHING MACHINES FOR INDUSTRY

WHICH SAFETY POSTER?

Begins on page 204

reader aware of the grief that can result from behaving unsafely. Hence the name.

Research has shown that these posters have higher attention value than other types. But they also induce a certain feeling of fear or dread. These emotions are unpleasant. They make workers feel tense and uneasy.

Other research shows that more accidents, proportionately, happen when a worker is in low spirits than when he is feeling good. So stirring up a worker's fears does not seem to be a particularly desirable way to encourage safety.

In addition, "misery" posters emphasize the punishment side of training—a sort of "do this and you'll be punished" approach. There is much argument over the value of rewards in learning. But most people agree today that rewarding correct behavior is a better way to teach than punishing wrong behavior.

The accidents shown in misery posters are relatively rare. They make up only a small part of the accident experience of most industrial firms.

Too often, in fact, the type of behavior advertised as leading to misery actually doesn't do so. In other words, the worker who puts his hand into moving machinery doesn't always get it torn off. This tends to make the relationship suggested by the poster less meaningful. The worker may continue to act unsafely because he has never suffered the consequences the poster describes.

Misery posters are also weak because they emphasize the *results* of a worker's actions, rather than the actions themselves. The orientation is in the dimly outlined future for the worker. But, for best results, training should be directed at current behavior, not at some misbehavior that may happen later on.

2 · The Cold-Turkey Instruction Poster

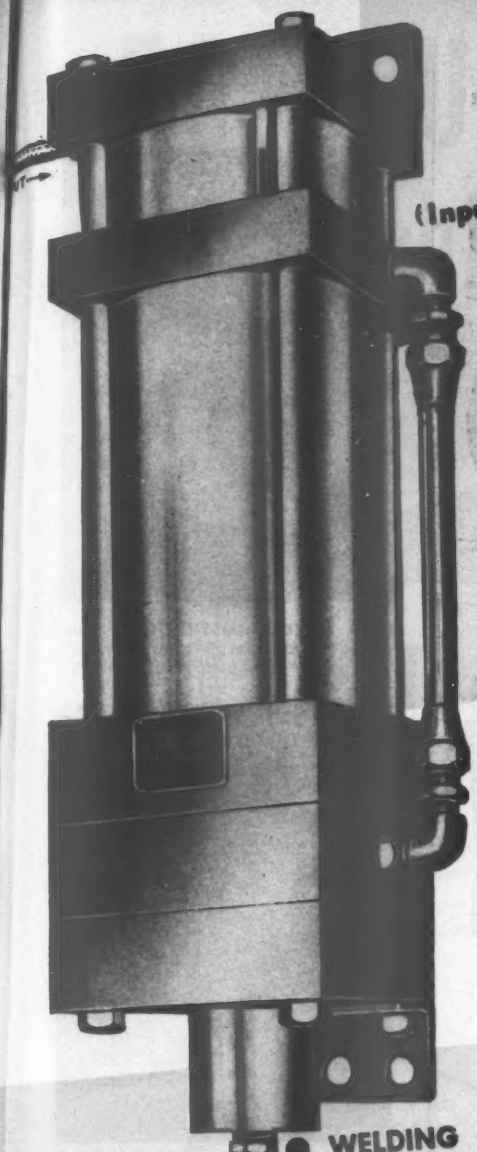
This type of poster uses two different approaches: *how to do it*, and *how not to do it*. Neither approach has the undesirable emotional features of the misery posters. And neither highlights future possible consequences, nor puts emphasis on unusual types of

BOOST 80 PSI AIR

(Input Range: 40 to 3000 psi Air or Fluid)

TO . . . 2000 PSI HYDRAULIC PRESSURE

(Output Range: 200 to 10,000 psi Fluid)



with Miller

Fluid Pressure BOOSTERS

From ordinary plant air line pressure, Miller Boosters produce hydraulic pressures (from 200 to 10,000 psi) for driving one or more hydraulic work cylinders simultaneously at from 30 to 450 strokes per minute. Ordinarily, the booster operates one stroke for each stroke of the operated work cylinders.

Used in place of conventional type hydraulic pumps, Miller Boosters save space and weight, permit convenient portability and are easier and less costly to install, operate, and maintain. Also, they hold pressure *indefinitely —without the motion and heat generation of ordinary pump circuits.*

Used in place of air cylinders, the booster driven hydraulic work cylinder, which can do the work of an air cylinder ten times as large and heavy, saves space and weight at point of application of cylinder thrust—since the booster itself can be mounted separately—away from the hydraulic work cylinder—and either on or off the equipment or machine.

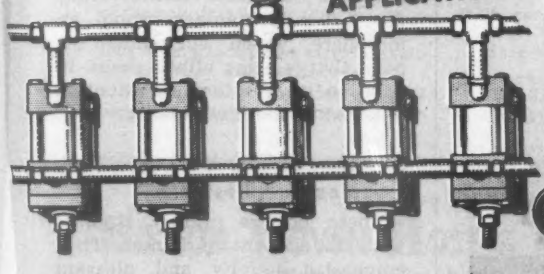
In many installations, the popular Miller Dual Pressure "Air Miser" Booster *saves up to 95% of the air* normally consumed by direct-driven air cylinders.

A wide selection of sizes, pressure ratios and mounting styles are available for the first time at low cost on a normal delivery schedule because Miller Boosters are built up from stock Miller standard cylinder parts to eliminate costly designs, patterns and castings.

Especially Recommended for . . .

- WELDING
- PUNCHING
- SHEARING
- CLAMPING
- RIVETING
- CRIMPING
- PRESSING

and SIMILAR APPLICATIONS



Full Details In Miller Bulletin B-200 Sent FREE On Reques

OTHER MILLER PRODUCTS INCLUDE: AIR CYLINDERS, 1½" to 20" BORES, 200 PSI OPERATION; LOW PRESSURE HYDRAULIC CYLINDERS, 1½" TO 6" BORES FOR 500 PSI OPERATION, 8" TO 14" BORES FO 250 PSI; HIGH PRESSURE HYDRAULIC CYLINDERS, 1½" TO 12" BORES, 2000-3000 PSI OPERATION. AI MOUNTING STYLES AVAILABLE.

Miller

MILLER MOTOR COMPANY

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AIR AND HYDRAULIC CYLINDERS · ACCUMULATORS · COUNTERBALANCE CYLINDERS · BOOSTERS · AIR HOI

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HARTFORD — NEW YORK CITY — DAYTON — ST. PAUL — FORT WAYNE — INDIANAPOLIS
MILWAUKEE — NASHVILLE — SEATTLE — LOS ANGELES — SAN FRANCISCO — BALTIMORE
ST. LOUIS and OTHER AREAS.

Sales and Service from coast to coast

A Better Tie at Lower Cost... with GERRARD ROUND STEEL STRAPPING

● Gerrard Steel Strapping does a better tying job. It clinches tightly at the corners, grips evenly, holds firm despite rough handling, and delivers packages to their destination in top notch condition.

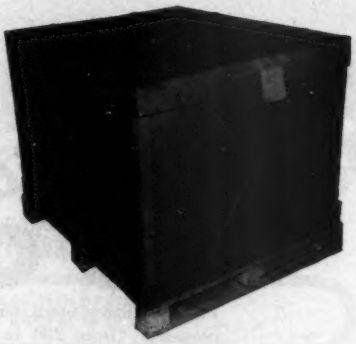
Shape and size make no difference. Gerrard Round Steel Strapping is adaptable to packages of any shape, size or material . . . to heavy palletizing . . . and to a wide variety of products which may be shipped without containers when bound securely.

The Gerrard method of strapping saves time, labor and money. Gerrard Strapping alone costs, on the average, about 40% less than any other metal reinforcement. And its use will effect other economies in your operations.

Get the complete story from a Gerrard engineer. His advice on your packaging problems is free. And write for a free copy of the *Blue Book of Packaging.*

Gerrard Steel Strapping Company
2927 West 47th Street
Chicago 32, Illinois

No container is necessary to assure safe delivery of this flexible metal hose. 4-way reinforcement with Gerrard Round Steel Strapping makes a rigid bundle.



The Gerrard Diagonal Tie gives 6-way reinforcement to this fibre carton, increases its strength and rigidity, binds it firmly to pallet for easy handling.

Speed and convenience in handling recommend palletizing rear axle shafts. 3380 lb. load is kept firm and rigid by 4 Gerrard Round Steel Straps. (Photo courtesy International Harvester Company, Industrial Power Division.)

GERRARD ROUND STEEL STRAPPING

USS

UNITED STATES STEEL

WHICH SAFETY POSTER?

Begins on page 204

COLD TURKEY INSTRUCTION posters like these emphasize how-to-do-it (top) or how-not-to-do-it (bottom).

They're better than the "misery" type, but not the best.

accidents. These are favorable factors.

The *how not to do it* approach, however, does accent the negative side of the training program. For this reason, it is less desirable than the *how to do it* approach.

The biggest drawback is probably the fact that workers may resent the elementary school atmosphere which surrounds the point that is being talked about. In addition, such posters lose attention value after the first reading.

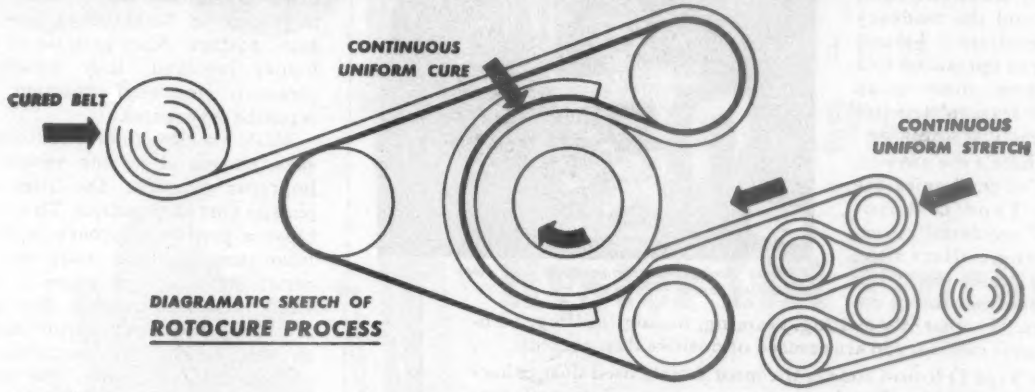
3 · The Guffaw-With-a Message Poster

These posters present training with an element of humor. They emphasize activity and pleasant

ROTOCURE Eliminates this "Achilles Heel"*

*Occasional failures which occur [illegible] Primarily [illegible] made by [illegible] You won't find these "Achilles Heels" of double vulcanization in BWH Conveyor Belts.

WITH BWH Conveyor Belts



DIAGRAMATIC SKETCH OF
ROTOCURE PROCESS

Curing a small segment of rubber belting *twice* is unavoidable when belts are made under the conventional flat press method. With this "stop and go" technique, a cured segment is advanced slightly less than a press length. As vulcanization is resumed, an overcured segment results due to overlapping. This twice-cured segment is a critical section or "Achilles Heel" of about 2 to 4 inches in length and the width of the belt. It is responsible for structural weaknesses and excessive surface wear which cause early belt failure and high maintenance costs.

To solve this problem, BWH technologists pioneered the ROTOCURE process of *continuous* vulcanization whereby every *inch* of belting receives the same, *uniform* curing treatment. Here are 4 important reasons why ROTOCURE has paid off for users throughout industry, in installation after installation—by longer service life before replacement.

1. Because there is no double vulcanization, uniform abrasion-resistant covers are always assured.
2. A continuous vulcanization eliminates the overlaps which can reduce flex life up to 40%.
3. Mechanical distortion (inherent with flat press curing at the press ends) is eliminated.
4. Constant uniform stretch results at all times.

As with conveyor belting — so with transmission belting, the BWH ROTOCURE process provides all these advantages plus a higher coefficient of friction because dusting agents are not required in the manufacture with ROTOCURE.

Call in the BWH distributor or write us direct for the full story of ROTOCURE and what it can do for you in keeping conveyor belts working efficiently longer — and holding belting costs down to earth.

Another Quality Product of

BOSTON WOVEN HOSE & RUBBER COMPANY

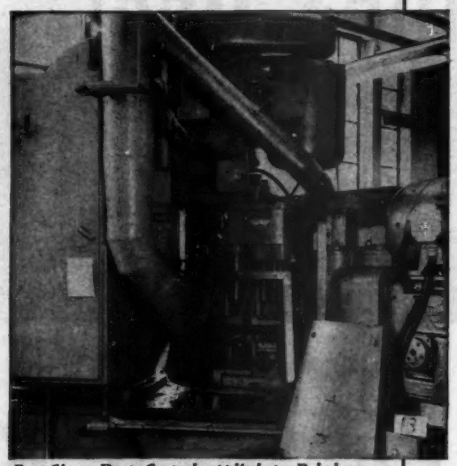
Distributors in all Principal Cities

PLANT: CAMBRIDGE, MASS. • P. O. BOX 1071, BOSTON 3, MASS., U. S. A.

BWH
DEPENDABLE RUGGEDNESS

Cast Iron machining dust giving you trouble?

IF SO, YOU'VE GOT A JOB FOR ROTO-CLONE DUST CONTROL



Roto-Clone Dust Control applied to Rehnberg-Jacobson Automatic which mills, drills, counterbores and reams.

Ex-Cello Boring Machine equipped with Roto-Clone Dust Control.

CAST iron dust has long presented a collection problem. Now, with increased machine tool speeds and the tendency to concentrate a greater number of operations in a given area, there is an ever-increasing demand for a practical solution.

And here's the answer. Scores of companies are using Type D Roto-Clones* successfully to exhaust and collect fine, floating cast iron dust from their machining operations. Whether it's drilling, reaming, boring, milling, turning or gear cutting, you are assured of positive dust control.

The Type D Roto-Clone is the most widely used dust collector in industry today. Its advantages are many—constant efficiency under all operating conditions, uniform air volume, small space requirements and ease of installation. When desired, a Cycoil Oil Bath After-Cleaner can be added which will provide the necessary cleanliness to permit recirculation of the cleaned air to the workroom.

For complete information on the application of the Type D Roto-Clone to cast iron machining operations, call your local AAF representative or write direct to—

**Roto-Clone is the trade mark (Reg. U. S. Pat. Off.) of the American Air Filter Company, Inc., for various dust collectors of the dynamic precipitator and hydro-static precipitator types.*

AAF

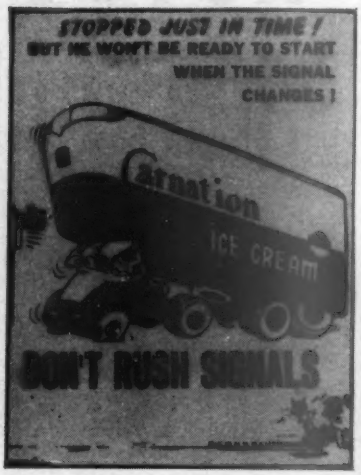
American Air Filter

COMPANY, INC.

361 Central Ave., Louisville 8, Ky. • *In Canada:* Darling Bros., Ltd., Montreal, P. Q.

WHICH SAFETY POSTER?

Begins on page 204



"GUFFAW-WITH-A-MESSAGE" posters like this are the best. They emphasize pleasant emotions, drive home positive ideas that lead to safe actions by workers.

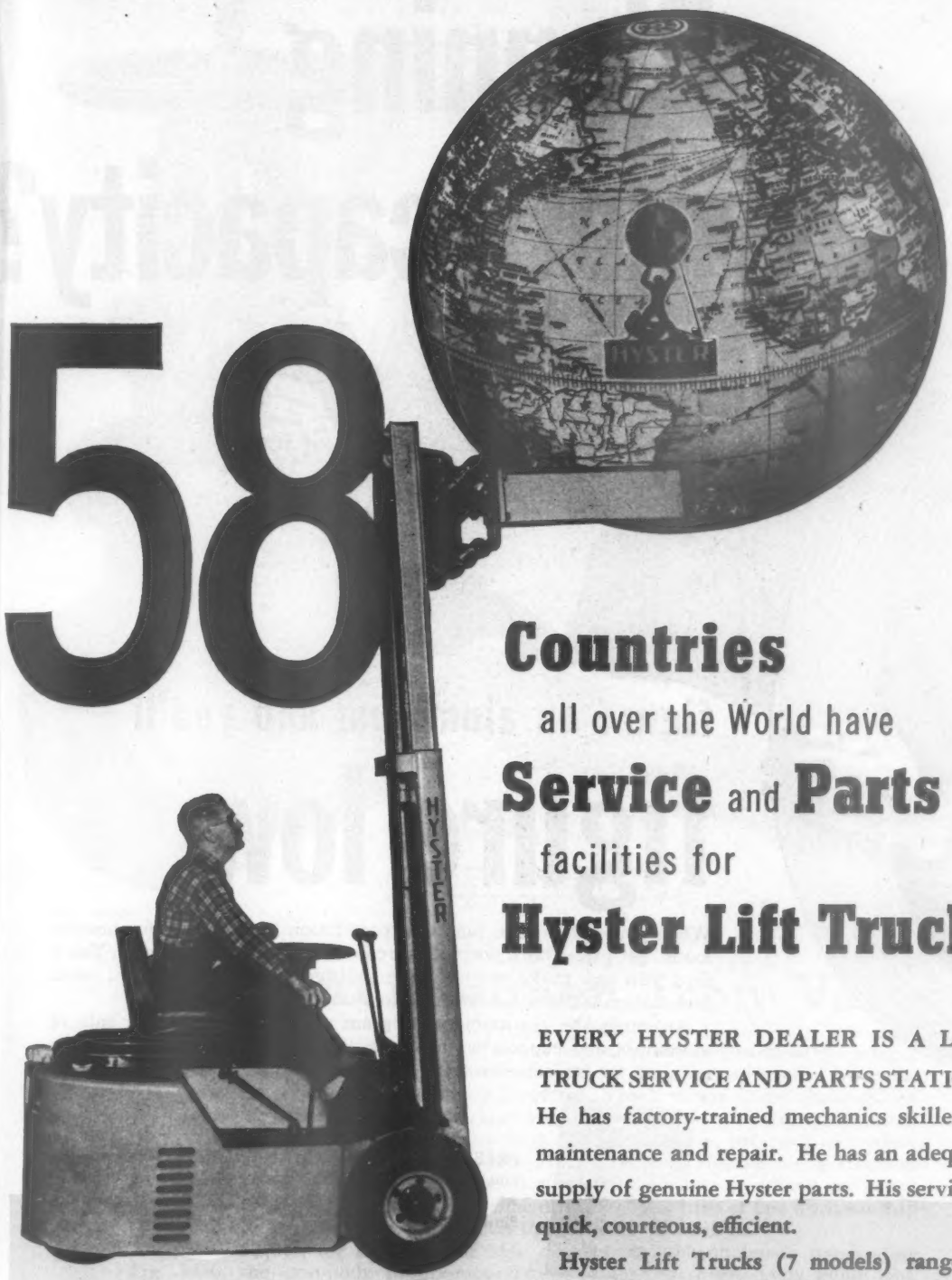
emotion. And they eliminate the brick-schoolhouse atmosphere that is present in "cold-turkey instruction" posters. Also, because of the humor involved, they create a pleasant emotional reaction on repeated exposures.

While some guffaw-with-a-message posters show the results of improper practices, the titles emphasize correct practices. This combines a positive approach with an interesting pictorial story on the results of unsafe practices.

All factors considered, the "guffaw-with-a-message" poster seems to best satisfy the requirements of a good safety poster. The learning or training is pleasant; the attention value of the posters is high; no brick schoolhouse atmosphere prevails; an applicable and important message is delivered; and there is a positive emphasis on safe practice.

In general, from a psychological viewpoint, the evidence seems to favor the humor type of poster, and place severe question on the continued use of the misery type.

Continued use of the same type of poster, however, may result in a certain amount of adaptation. The workers get used to the same fare day after day, and lose interest. So an occasional change of poster type is desirable. This change of pace can be just as useful in a safety program as it is to the baseball pitcher.



58 Countries
all over the World have
Service and **Parts**
facilities for
Hyster Lift Trucks

EVERY HYSTER DEALER IS A LIFT TRUCK SERVICE AND PARTS STATION. He has factory-trained mechanics skilled in maintenance and repair. He has an adequate supply of genuine Hyster parts. His service is quick, courteous, efficient.

Hyster Lift Trucks (7 models) range in capacity from 2,000 to 30,000 pounds. Hyster *Salsbury* Turret Trucks (4 models) for horizontal materials handling.

Call your nearest Hyster dealer when you need fast service and parts delivery.

HYSTER® COMPANY
THREE FACTORIES
2956 N. E. CLACKAMAS ST.. PORTLAND 8, OREGON
1856 NORTH ADAMS STREET.. PEORIA 1, ILLINOIS
1056 MEYERS STREET..... DANVILLE, ILLINOIS

Planning more capacity?

figure on aluminum and you'll

figure low

When you add feeders, plan new production lines or wire for heavier loads, get prices both ways. Figure in aluminum and in copper. You'll find you can make worth-while savings with aluminum . . . and installation is faster, easier, due to aluminum's light weight.

Although the rearmament program prevents unrestricted sale of aluminum and copper, we are ready to help you with the planning required for projects involving electrical wiring.

FREE "QUESTIONS AND ANSWERS" BOOK on installation of insulated aluminum conductors. Write for it now—ALUMINUM COMPANY OF AMERICA, 1771B Gulf Building, Pittsburgh 19, Pennsylvania.

Insulated **Aluminum Conductors**

ALCOA ALUMINUM ®

of ALCOA EC ALUMINUM are made by leading manufacturers

FIG. 1430

You'll Remember the Quality of Lunkenheimer Iron Valves

THE LUNKENHEIMER IRON VALVES you buy tomorrow — like those you bought many years ago — will still be remembered for their famous quality when the purchase records have been long forgotten. Think of the Lunkenheimer iron valves at work in your plant right now — serving you . . . day in, day out. When were they purchased? How long ago? Chances are, you can't remember, but you're sure to notice that they're *staying* on the job, consistently, giving you trouble-free service year after year. Today, Lunkenheimer iron-body valves are *better than ever before.* They combine the famous tradition of fine workmanship with Lunkenheimer's latest advances in metallurgy and design.

Rush your request for free Circular 564, describing Lunkenheimer's outstanding Fig. 1430, the iron-body bronze-mounted valve with *machined* body guide ribs, bronze bearings to prevent corrosion, and many other important advantages. Ask your leading industrial distributor, or tear out this page and forward it with your name and address to The Lunkenheimer Company, Box 360L, Cincinnati 14, Ohio.

IRON • • • STEEL • • • BRONZE

LUNKENHEIMER

THE ONE *Great* NAME IN VALVES

L-750-14A

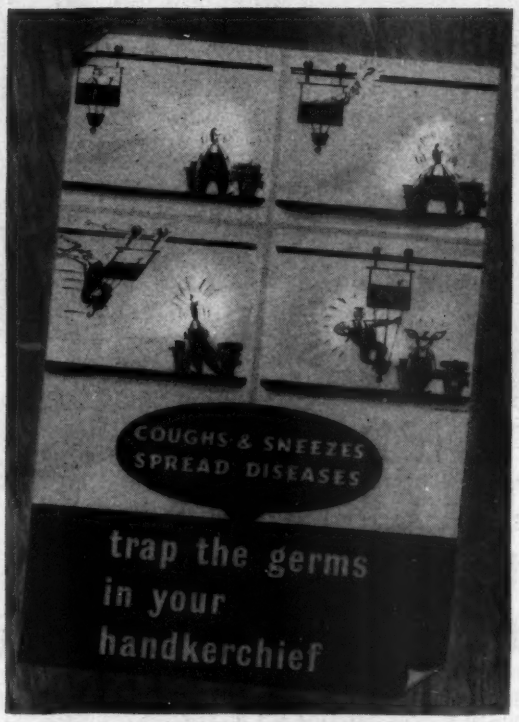
YOU MUSTN'T MISS—

INDUSTRIAL NEWS, BEGINNING ON THIS PAGE

TIMELY HINTS TO BETTER MANAGEMENT ON PAGE 222

QUOTES FROM INDUSTRY'S LEADERS ON PAGE 228

IDEAS TO STIMULATE YOUR THINKING, ON EVERY PAGE



INDUSTRIAL NEWS

English Factories Wage Cartoon War on Colds

Over 15,000 factories in England and Wales have recently been asked to display the clever poster shown above. It's a part of the Ministry of Health's campaign against spreading of colds through coughs and sneezes.

The ministry estimates that colds and influenza cost British industry 40-million man-days and tens of millions of pounds a year. It figures that sensible use of the handkerchief can do much to prevent the spread of these and other winter ills.

Television figures in another cartoon poster for the campaign. In this, the final picture shows an out-size handkerchief swathed around a TV set after the announcer has indulged in an uncontrolled sneeze. The National Pharmaceutical Union has taken over 11,000 copies of this poster for display in chemists' shops. Copies are also being offered to local authorities.

Rates on Return Pallets Shipped by Truck Cut in Half by ICC

The Interstate Commerce Commission has issued an order cutting in half truck freight rates on used, empty, returned pallets, platforms, or skids shipped in the north central states. The states affected are: Illinois, Indiana, Kentucky, Michigan, Missouri, Ohio, and Wisconsin.

Other states may be covered by the I.C.C. ruling later upon petition.

Previously, truckers were permitted to charge 5th class rates on minimum truckload shipments of 20,000 pounds and 4th class rates on less-than-truckload shipments. The new rates are about one-half the 4th class rates applicable on shipments of less than 5000 pounds.

For example, the new rate for shipping pallets between Chicago and Detroit (269 miles) is 45 cents per 100 pounds. The old rates were 90 cents per 100 pounds for shipments under 5000 pounds and 70 cents per 100 for shipments over 5000 pounds.

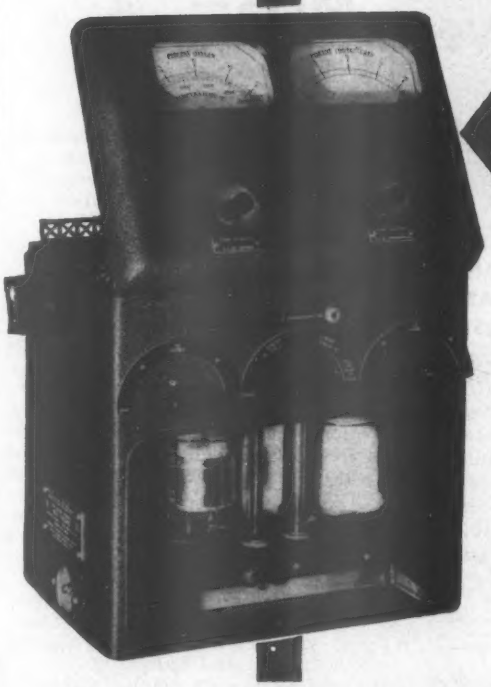
How's the Water Supply?

Not too bad, according to a survey recently published by the National Association of Manufacturers and The Conservation Foundation. The nation has by no means reached the limit of its water resources, and the possibilities for increasing the volume of water intercepted for public and industrial use are "tremendous."

NAM and the foundation made a joint study of water sources and uses in more than 3000 industrial plants. Here are some of the things they found:

1. Less than 2% of the plants studied account for 30% to 40% of the total water intake. Only 5.4% of these plants take in more than ten million gallons daily, but they account for more than 75% of the water use covered in the survey.

This suggests that future studies



THIS upped production ...AND HOW!

"Our Cities Service Heat Prover analysis really paid off in improved combustion control."
--Mill Operations Chief

This exclusive flue gas analyzer actually furnishes dialed information that promptly lets you figure . . .

1. **How much fuel may be going to waste**
2. **Presence of excess oxygen—big cause of scaling and heat loss**
3. **Energy losses due to unburned combustibles**

You'll get accurate data on any furnace—any type—any size. Arrange for this check-up; it will give you a quick line on higher productive efficiency. Coupon brings complete booklet free.

A COMPLETE LINE OF QUALITY LUBRICANTS FOR INDUSTRY:

Anti-Rust Hydraulic Oils
Heavy Duty Motor Oils
Metal Cutting Fluids
Lubricating Greases
Gear Compounds
Diesel and Steam Engine Oils
Plant Utility Oils

Plus two hundred other top quality petroleum products

THIS INFORMATIVE BOOKLET . . . COMBUSTION CONTROL FOR INDUSTRY . . . **FREE** WITH THIS COUPON

CITIES SERVICE

QUALITY PETROLEUM PRODUCTS

CITIES SERVICE OIL COMPANY
Sixty Wall Tower, Room 849, New York 5, New York

Please send me, without obligation, a copy of "Combustion Control for Industry."

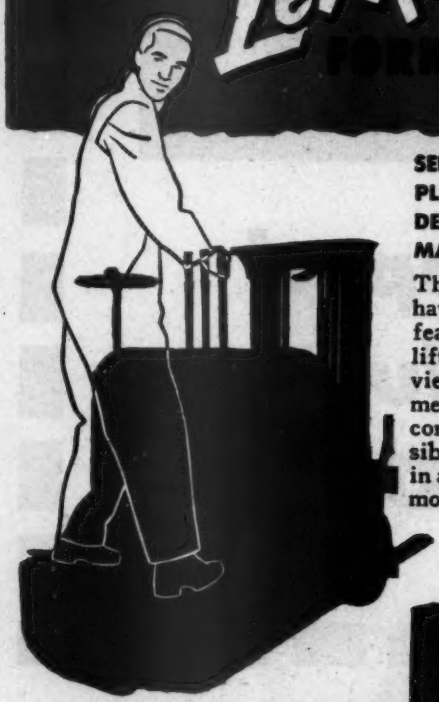
*Name*_____

*Company*_____

*Address*_____

*City*_____ *State*_____

MOBILIFT presents
2 New Lev-R-Matic Drive
FORK LIFT TRUCKS



SERVICE-TESTED ADVANTAGES, PLUS NEW MECHANICAL AND DESIGN FEATURES WILL SLASH MATERIALS HANDLING COSTS

The new models "E" and "ER" have all the proven *Mobilift* features including roller chain lift that allows unobstructed view between uprights plus mechanical improvements, new compactness and service accessibility never before possible in any lift truck. Save time and money with *Mobilift!*

STAND-UP MODEL "E": 2,000 lbs. capacity on 15" load center; outside turning radius—57". Shown with 63" mast. (Lift Height—68"; Free Lift—37".)

Grouped 2-Way Levers Perform All Jobs

Lev-R-Matic Controls...

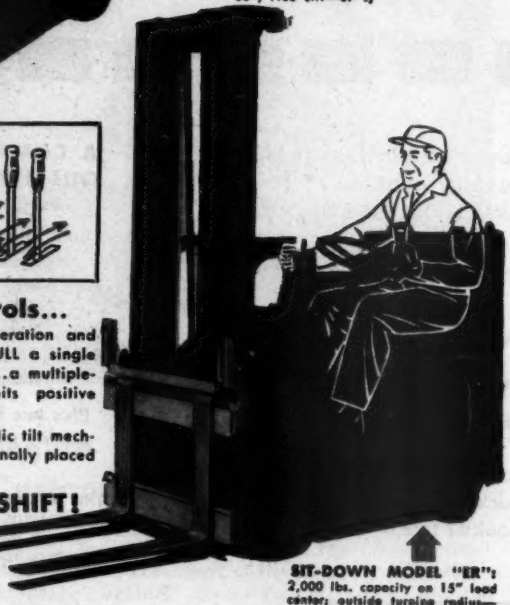
secret of speed, ease of operation and maneuverability...PUSH or PULL a single lever to go forward or back...a multiple-disc clutch smoothly transmits positive power instantly.

Roller chain lift and hydraulic tilt mechanism are activated by functionally placed 2-way levers.

NO GEARS TO SHIFT!

Write Today!

Get all the specifications and cost-slashing MOBILIFT advantages in the new "E" series Lev-R-Matic Bulletin.



SIT-DOWN MODEL "ER": 2,000 lbs. capacity on 15" load center; outside turning radius—63"; shown with 83" mast. (Lift Height—108"; Free Lift—57".)

MOBILIFT Lev-R-Matic DRIVE

MOBILIFT CORPORATION

835 S. E. MAIN STREET • PORTLAND 14, OREGON

2317 W. 18th, CHICAGO • 790 Patterson Ave., E. RUTHERFORD, N. J.

1133 Spring St. N. W., ATLANTA • 2724 Taylor St., DALLAS

2730 San Pablo Ave., BERKELEY • 1107 E. 23th St., LOS ANGELES

YOU MUSTN'T MISS—

Begins on page 214

of the industrial water problem can concentrate on the relatively few large users. It will have "considerable significance in planning the use of our water resources."

2. Total water consumption in the nation is estimated at 100-to-150-billion gallons a day. Industry uses roughly one-fourth of that total. These figures do not "represent the limits within which the future growth potential of the nation must be met."

3. About 30 inches of precipitation occurs annually over the U.S. About 21.5 inches returns to the atmosphere. The other 8.5 inches runs off into streams and thence into oceans. Only about three-quarters of an inch of all this water is intercepted annually and used by man.

"Thus, there are tremendous possibilities for increasing the volume of water intercepted for use by the public and industry."

4. Petroleum refining and paper and pulp manufacturing are the two industries using the most water.

5. While industrial production almost doubled between 1939 and 1949, the average increase in water consumption in plants surveyed was 36%.

6. Only 17% of plants surveyed expressed belief that pollution is "serious" in their areas.

7. Fewer than half reported that they had any water treatment facilities. Of those who do, almost 90% use them for treating water prior to use.

8. Waste water is not treated by 82% of the plants. But this figure includes many where treatment isn't necessary, since use doesn't affect water purity.

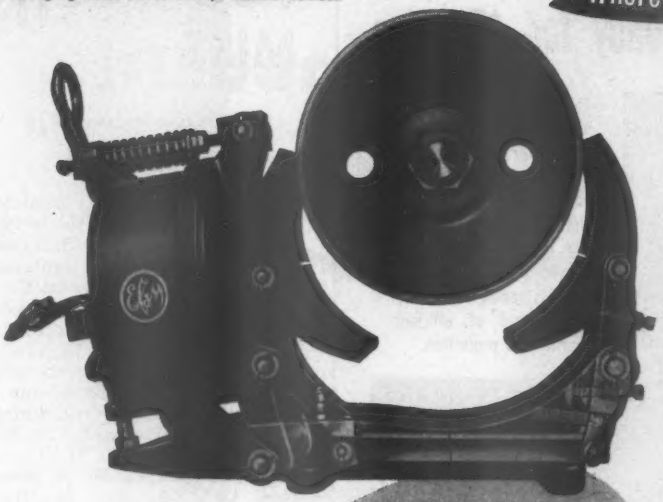
There's a definite relationship between size of plant and treatment of waste water. Only 13% of plants with less than 100 employees do it, compared with 44% of plants with more than 2500 employees.

9. The average plant uses one-quarter of its water intake for cooling, one-quarter for sanitary and service purposes, one-eighth for boiler feed, and three-eighths for process use. However, among the over-50-million-gallons-a-day users, cooling is the most important use.

10. More than 60% of plants surveyed don't re-use any of the water they take in.

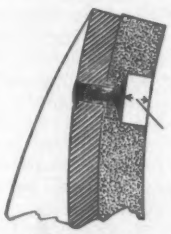
More on next page

Type WB Brake showing how the motor armature is easily lifted out. At top left is the handle-nut for compressing the spring when removing motor armature, changing brake shoes and for manual control.



Long Life Brakes for A-C and D-C Motors by EC&M

The brake lining is molded to match curvature of wheel and shoe.



Actual wearing thickness, between rivet heads and brake wheel, is 1/8" on the smallest size to 1/4" on the largest size.

These Type WB Brakes use a block type lining which is both thick and tough.

Furthermore, due to the process of manufacture, the blocks have proper frictional quality *throughout the entire thickness* permitting uniform and complete wear down to rivet heads. And since the material is non-compressionable, brake adjustments are infrequent.

Where You Will SAVE With WB Brakes

A-C Mine Hoist Motor with WB Brake

Reduces Delays on Foundry Crane

Bucket-Crane Trolley with WB Brake

WRITE FOR COMPLETE FACTS—Ask for No. 18 ACCELERATOR Bulletin

THE ELECTRIC CONTROLLER & MFG. CO.

2698 EAST 79TH STREET • CLEVELAND 4, OHIO

47 YEARS OF SERVICE

and a few repairs make it ready for 47 more

The door at left has been in continuous service since 1903—for 47 years! The picture was taken this year, just before curtain slats were replaced and a few minor repairs made. In the photo below, the door is ready for many more years of efficient service and protection.

Another User Proves the Extra Value of KINNEAR Steel Rolling Doors

You can find many similar records of long service for these famous doors in the Kinnear files—more proof that their interlocking steel-slat construction, *originated by Kinnear,* combines rugged durability and protection with smooth action and space-saving efficiency.

Kinnear Rolling Doors open straight upward and coil completely out of the way above the lintel. All surrounding floor, wall and ceiling space is fully usable at all times, because the doors need no extra room for opening and closing action.

When closed, these all-steel doors give an extra measure of protection against fire, theft, intrusion, wind and weather, or accidental damage.

Kinnear Rolling Doors, built to fit openings of any size, are easily installed in old or new buildings. Equipped for operation by hand-lift, chain, crank or electric motor. With Kinnear Motor Operators, they offer the added convenience of push-button control, plus remote controls at any number of points, if desired. Write today for complete information.

Saving Ways in Doorways

KINNEAR ROLLING DOORS

The KINNEAR Manufacturing Co.

FACTORIES: 1540-60 Fields Ave.—Columbus 16, O.
1742 Yosemite Ave.—San Francisco 24, California
Offices and Agents in all Principal Cities

YOU MUSTN'T MISS—

Begins on page 214

11. The most widely used source of industrial water is the municipal river or lake plant. Half the reporting plants draw water from suppliers of this type. Of the rest, 29% use their own wells and 11% maintain their own river or lake plants.

For free single copies of the 51-page booklet containing the complete study, write National Association of Manufacturers, 14 W. 49th St., New York 20, or The Conservation Foundation, 30 E. 40th St., New York 16.

New Group Aims at Better Industrial Relations

An organization called Industry Council Association, Inc., proposes a brand-new approach to industrial peace. The basic idea is to stress public participation and lessen government's role in labor-management relations.

To do this, the association wants to bring labor-management and the public together into councils in each industry at local, state, and regional levels. The association would serve as a clearing house of information for the network of councils.

Here's how the plan would work, according to Rev. William J. Kelley, a member of the association and past chairman of the New York State Labor Relations Board: At each level, labor and management council members would choose public representatives to sit in the councils the year around. The councils would then serve as educational and discussion groups. They would talk over subjects now commonly outside the area of collective bargaining—production methods and consumer relations, for example.

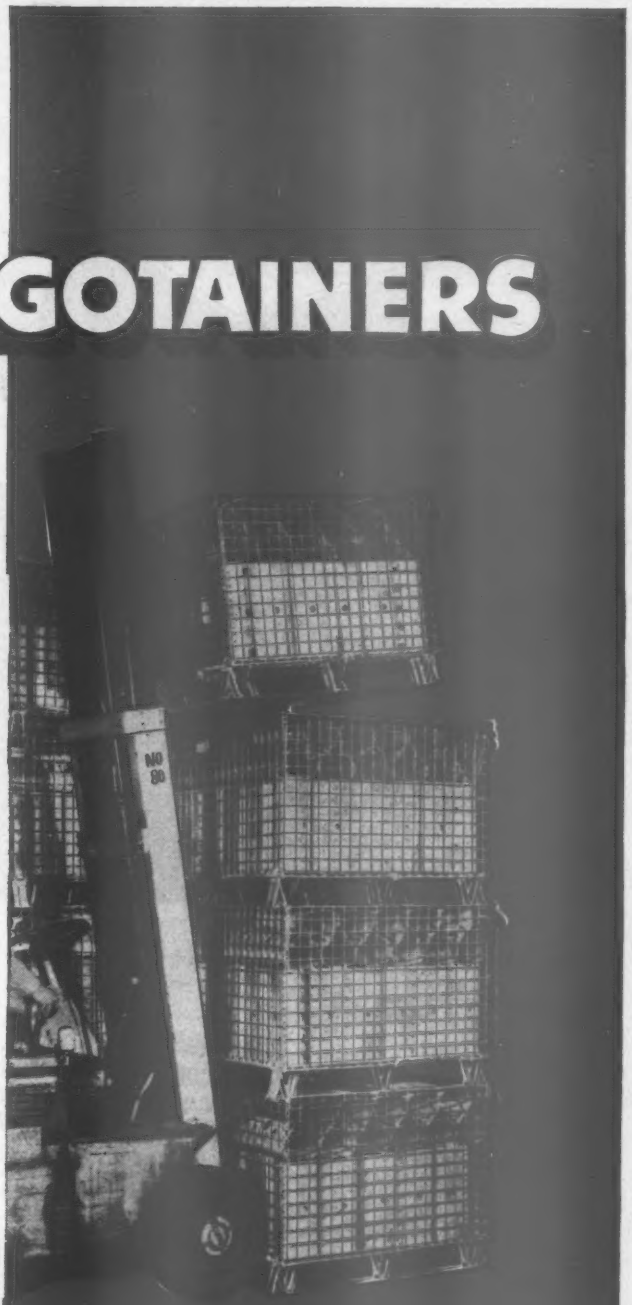
Through these discussions, Father Kelley maintains, public sentiment, a force of great influence, would be brought to bear on industrial relations. He added that the work of the association would in no way interfere with the normal processes of mediating individual labor disputes. But he believes that the need for governmental intervention can be reduced by setting up these cooperative discussions at the "grass roots" level.

More on next page

Pittsburgh CARGOTAINERS

YOU SAVE ON

Handling with Cargotainers, as parts from production line go directly to **storage** or shipping dock. Inventory is easy—items accessible at all times. **Shipping** costs are reduced. There is no re-handling of parts. Fork truck delivers from receiving dock to **assembly line.** Use Pittsburgh Welded Wire Cargotainers—they fold, save space, time and money. Write Department F,



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A Subsidiary of

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Champion makes the lamps you need to fulfill your lighting requirements. Use them for all general lighting . . . for efficiency...for economy. Use them for drying . . . for heat...for any special need to withstand shock, vibration or exposure.

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Prove their superiority by delivering 3 times the life, 3 times the value, 3 times the economy. CHAMPION Bi-pin Fluorescent Lamps are sold with a guaranteed average rated life of 7500 hours on 3 hour or longer burning cycles.

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When next you need Lamps, specify Champions! Order them from your nearby Champion supplier, confident of receiving the fullest measure of value — topmost quality that applies to the complete range of more than 2000 different types, styles and sizes of Champion Lamps, Fluorescent and Incandescent.

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Lynn, Massachusetts
A DIVISION OF CONSOLIDATED ELECTRIC LAMP CO

YOU MUSTN'T MISS—

Begins on page 214

Blast Furnaces Are "Personal Property"

They're not real property. That's a recent ruling of the Ohio State Board of Tax Appeals. It came in a tax case filed by National Tube Company.

In the tax years of 1942, 1943, and 1944, the company was assessed nearly $100,000 in taxes against two reconstructed blast furnaces—then considered by the county assessor as real property. The state board ruled that the assessor was wrong.

At present, no one knows whether that will mean more or less taxes for National Tube. Personal property is taxed at 50% of its depreciated purchase price. Real property is taxable at 40% of appraised value.

The blast furnaces are personal property, said the board, because they can be moved, are good for only one purpose, and were intended to be personal property by National Tube.

Smokeless Smoke Stacks

Usually they're a sign of poor times. But not at the National Works of National Tube Company, McKeesport, Pa. Business there is booming, even though the five smokestacks don't give off smoke. Smoke control is the answer.

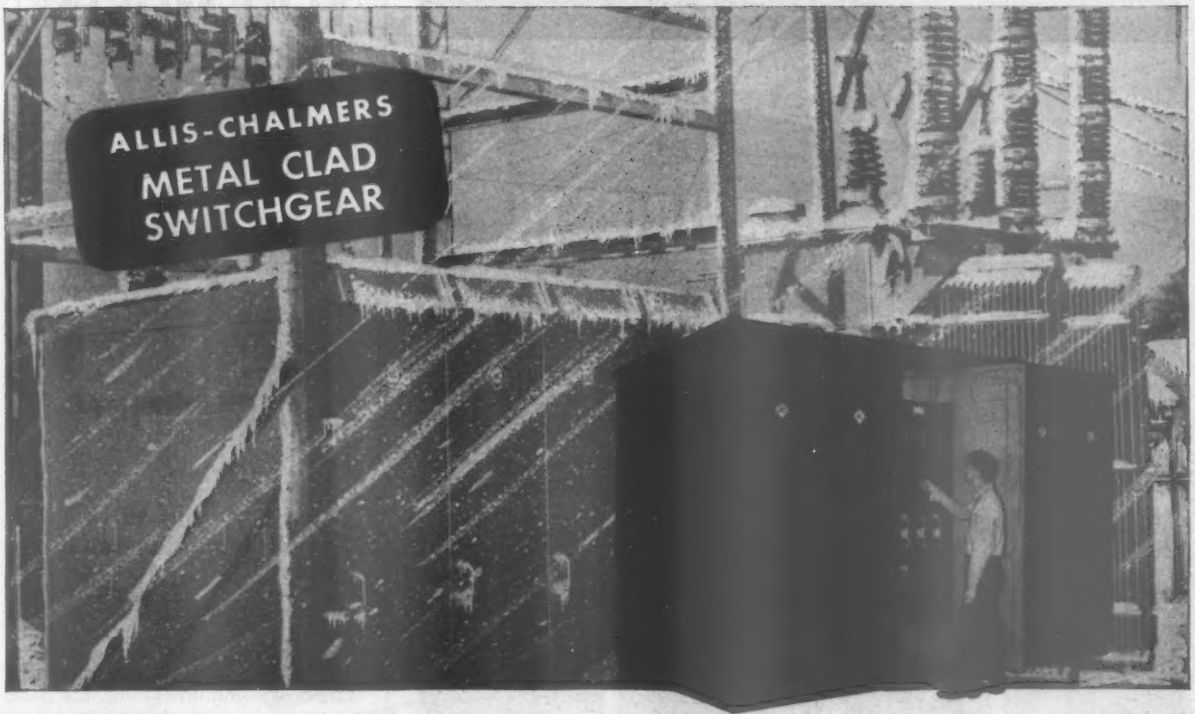
In the boiler plant, two gas washers and a companion setup of electrostatic precipitators clean gas from the blast furnaces.

A second anti-smoke measure is the use of dust collectors. They virtually eliminate the fly ash coming from the boiler stacks when coal is burned instead of blast furnace gas. The coal is pulverized, and the small amount of fly ash remaining is trapped by filters between the furnaces and stacks.

The gas washers cut the dust content of gas entering the boilers to about one-hundredth gram per foot —cleaner than the outside air. A multiple battery of water sprays inside the washers does the trick.

Dust recovered from the furnace gas collects as sludge in a 90-ft. circular thickening tank. The tiny iron-bearing particles are then caked and re-used in the blast furnaces. By using this system, the company expects to recover some 100 tons of iron ore every 24 hours.

More on next page



"Weather-Proofed"

AGAINST RAIN, SLEET, SUB-ZERO TEMPERATURES AND HIGH WINDS!

WEATHER-PROOFED Allis-Chalmers switchgear performs dependably in rain, sleet, sub-zero temperatures and high winds. Weather-proof construction provides protection in any weather... any atmosphere.

Here's why: (1) welded-in floor plates form tight bottom seal; (2) overhanging eaves keep out driving rain and sleet and protect vital switching equipment; (3) front and rear weather-proof door are held closed at three points; (4) rust resistant phosphate treated steel panels, multi-coated with weather tested paint, complete the top-to-bottom weather barrier; (5) ice and sleet shields protect locks.

Contact your local A-C sales representative for further information or write direct.

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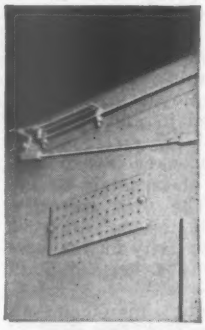
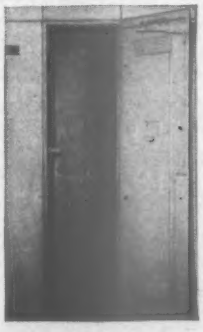


Protected Ventilation

Copper mesh filters behind louvre openings bar the entry of dust, dirt, insects, etc. They allow air to circulate and cool the switchgear interior. Space heaters prohibit moisture condensation, a frequent cause of insulation failure.

Full Length Instrument Panel

Provides more space for meters, relays, instruments. Panel swings out so you can readily reach secondary wiring. Provides protection, too. This design is adaptable to a variety of circuit arrangements.



Safer Than Ever Before

Bolted-on steel barriers completely isolate circuit breaker, current transformer, disconnect switch, lightning arresters, drawout potential and control transformer, and other equipment compartments.

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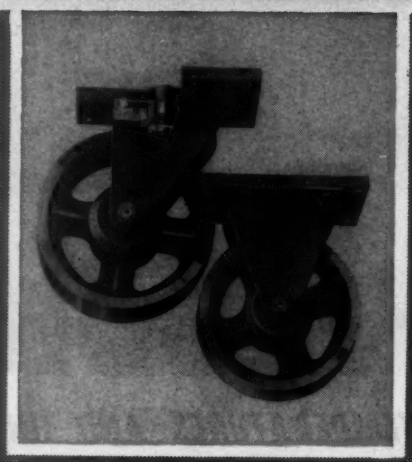

There is a type of Darnell Caster or Wheel for every kind of use and floor. Made for light, medium and heavy-duty service, you are sure to find in the Darnell line the exact caster or wheel to meet your individual requirements . . . Ask your distributor for your copy of the new 192 page Darnell Manual

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Begins on page 214

TIMELY HINTS

What's Wrong With Our Communications?

According to Peter F. Drucker, economist, what's wrong is that management has applied communications techniques haphazardly, without first thinking through the fundamentals. He feels that the target of communications, the basic assumptions underlying present efforts, and the concept of communications itself are all open to serious questioning.

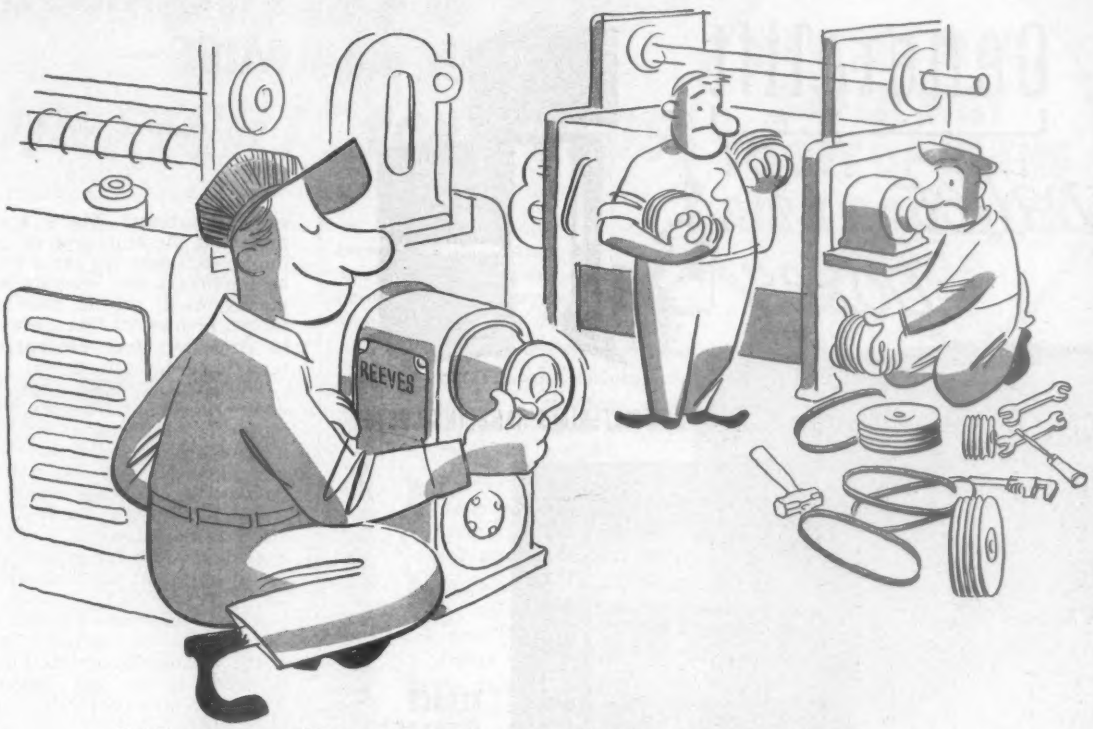
In a recent speech at the Third Annual Conference of the Public Relations Society of America, Inc., Drucker made the following points:

1. In respect to technical information on its product, processes, tools, and techniques, management has no communications problem. Employees accept management as both competent and authorized to speak in these technical areas.

But in the economic, political, and business areas, it's a different story. People, even though they may agree with what management says, don't feel that management has any right to advise about these things. What's more, they don't think management is qualified. Thus, receptivity is nil. Nobody listens to somebody who in his opinion has neither competence nor authority.

So is there any point to the numerous communications programs aimed at "employee education?" Do they succeed in getting across management's ideas on economics and politics? Drucker says no. He says this kind of target is an impossible one. The first objective, says he, should be to establish respect and receptivity for management. And that's a very difficult target in itself.

2. What about management's basic assumptions in the field of



"Non-stop Bascom, they call him, since the boss put him on that REEVES-equipped machine"

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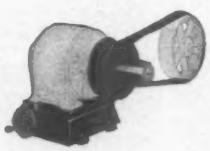
VARIABLE SPEED TRANSMISSION provides infinite, accurate speed flexibility over a wide range—2:1 to 16:1. Capacities to 87 hp.



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MOTODRIVE combines motor, speed varying mechanism and reduction gears in a single unit. Speed variations 2:1 to 10:1 inclusive. Sizes ¼ to 20 hp.

Increase work range and production capacity. Eliminate downtime for speed changes. Equip your machines with REEVES Variable Speed Drives! REEVES permits instant, accurate, positive speed changes—*while your machines are running.* And REEVES assures the *right* unit for your particular use. For REEVES is the one complete line of variable speed drives . . . available with a wide selection of manual and automatic controls.

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Recognized leader in the specialized field of speed control engineering

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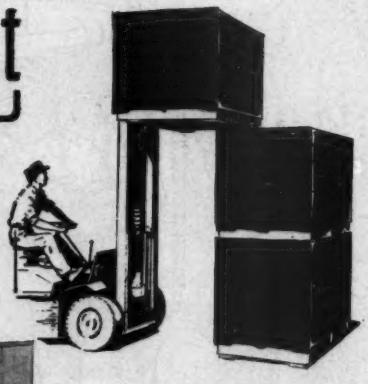
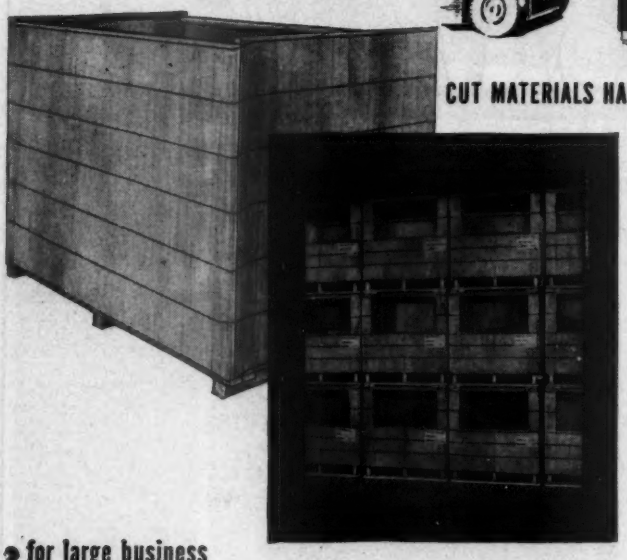


CUT MATERIALS HANDLING COSTS



REDUCE STORAGE COSTS

• for large business
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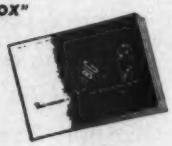
• for ALL business

More and more manufacturers are helping solve their materials handling problems and storage problems with Generalift Pallet Boxes. It's the versatile container that sharply cuts costs . . . and helps step up production . . . because ONE workman, fork-lift truck, and Generalift Pallet Box do the work of many employees. Write us. We'll promptly provide full information on the Generalift Pallet Box, on ANY of our shipping containers.

WE WILL MAIL FREE COPY OF "THE GENERAL BOX"

This colorful booklet illustrates and describes the many advantages of the Generalift Pallet Box. We will be glad to mail upon request.



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ALL TYPES OF ENGINEERED SHIPPING CONTAINERS

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communications? There are two: first, that the employee or general public considers the same things to be important and relevant as does management; second, that the listeners, or most of them, are hostile to American free enterprise and tend towards collectivism.

There's no basis for either assumption, says Drucker. The employee is interested in the happenings in his own company that affect him. But this has nothing to do with his feelings about or interest in general national policy. He may be fully convinced of his company's need for profits, and yet feel deeply that national profits are too high.

A knowledge of economic facts is essential to management, but not to the worker. What difference does it make to his life whether he knows them or not He's just not interested.

The communications job to be done, then, is to create sympathetic understanding among employees for *management's* concern with these things.

3. Management's own concept of communications is confused. When management men talk about communications, they mean media such as company magazines, annual reports to employees, company advertisements, etc. Actually, these things play a very subordinate role.

Communcations is simply a phase of employee relations. Every time company and employee are in contact, there are informal communications. Formal communications media are necessary to formulate and bring out the communications that have taken place in the day-to-day relationship between man and company. If they deal with something irrelevant, they are worthless, or even harmful.

If you are really concerned about communications, s a y s Drucker, look at your day-to-day policies and practices. Do they get across to the employee the things you believe he ought to get about the company, the management, our free enterprise economy, and society?

Standardize Production

That was the theme of a recent talk made by Roger E. Gay, president of Bristol Brass Company. Speaking before the first annual

SAVE up to 70% with Aluminum Alloy "UP-RIGHT" SCAFFOLDS

NEW, FASTER, SAFER WAY TO GET UP IN THE AIR & ROLL WITH THE JOB

Industrial users everywhere report time and labor savings over old-fashioned methods. In fact, savings on even single jobs have more than covered the cost of the scaffolds. Indispensable for efficient painting, cleaning, relamping and overhead maintenance on machinery, walls, ceilings, piping, ventilating and heating installations in large or small plants. And NO scaffold except an "UP-RIGHT" is engineered to provide these advantages . . . .

- **Lightweight. Aluminum alloy is stronger than structural steel yet one-third the weight.**
- **Patented one-piece sections with built-in stairway. Sections fold flat for easy storage.**
- **Built-in legs . . . *instantly adjustable* for rapid levelling on uneven floors or on stairways.**
- **Patented casters with single swivel-and-wheel lock.**
- **No rust.**
- **No wrenches, wing nuts, bolts or loose parts.**

30′ Mobile TOWER SCAFFOLD

which took only 10 minutes to erect. A tower of any other height desired can be erected by using the required number of standard 6′ or shorter sections. Each one-piece section is easily handled by one man.

ROLL-AROUND and SAFETY CAGE

Provides new, faster method for covering entire wall areas of tanks. Can be rigged by one man. Roll-Around is anchored to eye bolt on top of tank. Safety cage is raised or lowered while rolling around.

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Mobile 6′, 8′ or 10′ SPAN SCAFFOLDS

"The only way to get over looms and spinning frames," reports textile plant manager. Ideal for narrow aisles and cluttered areas in any factory.

Before buying scaffolds insist on a demonstration . . . then buy the best—the one and only

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KELLER AIR HOIST for SAFETY

The air-operated motor in a Keller Air Hoist is free from spark hazard—hence when equipped with plated chain it can safely be recommended for use in the presence of inflammable materials, including explosive gases.

There is no shock hazard under wet conditions—it can safely be used over wet floors, or out-of-doors in any weather.

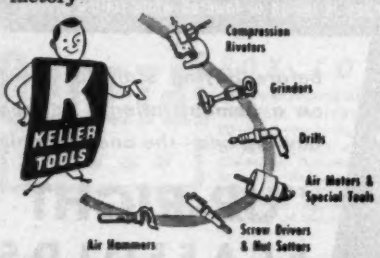
Other advantages are its light weight (30 lb*), small size (15" long, 5" diam*), variable speed (from a creep to 17 fpm*), and negligible maintenance.

*for 1000-lb Hoist. Capacities of 300, 500, and 2000 lb also available.

Air Hose Trolley

Keeps air hose conveniently suspended, permitting it to follow a trolley-suspended Keller Air Hoist.

Keller Air Hoists, Hoist Trolleys, and Hose Trolleys are available through Keller sales offices, or direct from the factory



KELLER

Pneumatic Tools

KELLER TOOL CO., GRAND HAVEN, MICH.

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Begins on page 214

National Standardization Conference of the American Standards Association, he told how standardization could help industry meet demands for military products without drastic cutbacks in civilian output.

His plan urged national standardization on a large scale—of products, of buying procedures, and of ideas. There are too many engineers, both in industry and the military services, who want something special. Gay said industry must fight that idea and trend. In some cases, of course, products for the military require a departure from commercial standards. But wherever possible, said Gay, "Let's assimilate the military specifications with the commercial standards." For standardization leads to simplification. And simplification leads to more production, more economy, and more profits.

Wanted: Industry's Cooperation

Your cooperation can help reduce the present shortage of freight cars. A six-page pamphlet put out by the National Chamber of Commerce tells how. Here's the Chamber's checklist for shippers:

1. Load cars to full limit.
2. Load cars promptly.
3. Notify railroad immediately when empty car is available.
4. Load and unload cars six days a week.
5. Load cars in direction of owner's rails.
6. Remove all dunnage, blocking, and rubbish from empty cars.
7. Order cars only as needed.
8. State needs as to size, type, destination, and route.
9. Avoid loading high-class cars with contaminating commodities.

Working With the AEC?

Concerns connected with or interested in the Atomic Energy Commission reactor development program can make application to send their engineers or scientists to the Oak Ridge School of Reactor Technology. Applications for 1951-52 session of training in reactor theory and technology will be received until March 1st. Industrial students remain on the company payroll.

NOW CLEAN GENERATORS MOTORS Without Solvents

NO Drying Period Toxic Hazards

with New Pangborn AC-4 Blast Machine

NOW YOU CAN clean electric motors, generators and turbines *without solvents!* The new Pangborn AC-4 Blast Machine scours armatures, parts, frames, coils, etc. with soft (20-mesh) corncob grits.

Since no liquids are used there is no need for drying periods and toxic or explosive hazards are eliminated. Large equipment can be cleaned *in place* and no residue is left to create gum or to break down insulation.

Simple and Inexpensive

New Pangborn AC-4 Blast Machines operate from a standard 40-pound air supply. Material costs average 1/10 of other methods and complete cleaning is finished in half the time.

FOR DETAILS, write today outlining your operation. Address: PANGBORN CORPORATION, 2100 Pangborn Blvd., Hagerstown, Maryland.

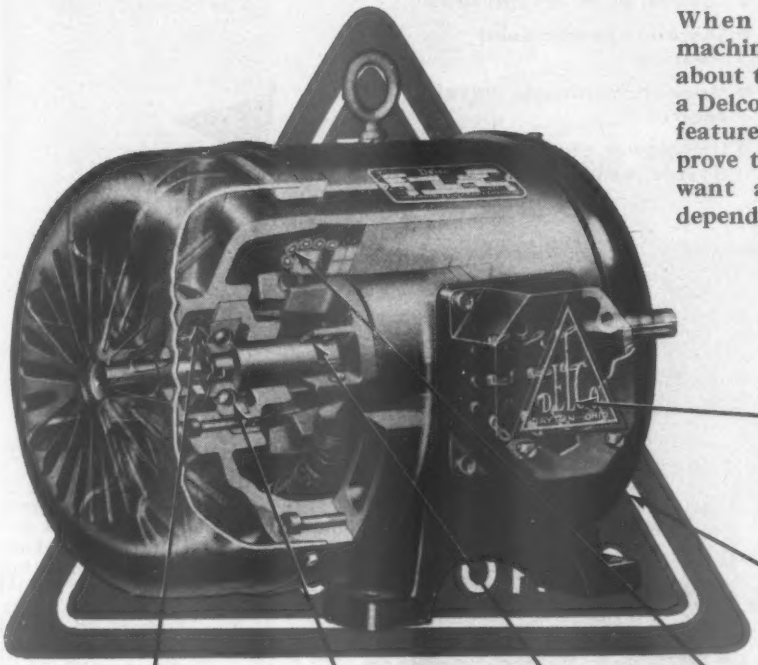
Look to Pangborn for the Latest Developments in Blast Cleaning and Dust Control Equipment

Pangborn

BLAST CLEANS CHEAPER with the right equipment for every job

Here's the "INSIDE STORY" on DELCO MOTORS

When you invest in new production machinery, it pays to be just as particular about the motor that drives it. Look inside a Delco Motor. You'll see extra engineering features, extra care in construction, that prove to you a Delco is built the way you want a motor built. Specify Delco for dependable power day in, day out.



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More solid, more rugged

POSITIONED BEARINGS
Maintain shaft alignment

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Lengthens bearing life

DYNAMICALLY-BALANCED ROTOR AND SHAFT ASSEMBLY
Reduces vibration, wear

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Over and above NEMA specifications

"DELCO PREFERRED
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Open and enclosed motors for most industrial applications in sizes up to 100 horsepower for standard foot mountings. NEMA C&D flange-mounted motors available in sizes through 30 horsepower. Get in touch with Delco Products, Dayton, Ohio . . . or any sales office listed below.

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all this IN ONE TRUCK

- 130" extreme lift
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- Simple, *single cylinder*, low pressure hydraulic lift with cross suspension.
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Right angle stacking a 48" long pallet load in a 10 ft. aisle.

Be sure to investigate the new MERCURY JEEP Model-230 before deciding on any 2000 lb. capacity truck. Check its unusual versatility . . . its many operating improvements and you will agree the new Jeep is without equal for efficient low cost handling. Completely described in Bulletin 295. Write for your free copy.

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MERCURY Jeep
MODEL 230
2000 LB. CAPACITY

TRACTORS • TRAILERS • LIFT TRUCKS

YOU MUSTN'T MISS—

Begins on page 214

QUOTES

Efficiency Is More Important Than Attitude

"The businessman, just like every other individual, is motivated primarily by self-interest. We hope that self-interest is enlightened, but whether it is or not, if he directs his business in such a manner as to give a good economic performance and produce goods of the greatest value, then he promotes the public interest whether or not he intends it, wants it, or even knows it."—*Ralph E. Flanders*, United States Senator, and ex-president of ASME.

Ways to Increase Production

"As we gear production to demands ahead, I suggest we first concentrate on how to reduce waste in our plants. Many of you will agree with me that there is too much waste of materials, waste of effort in our operations. As we fight to prevent a war, we can best succeed by declaring war on waste.

"The same is true as we set out to examine the production lost as a result of machines being down. It is inevitable that some machines will be down for maintenance and repair. But even in highly efficient factories production can be increased by giving careful attention to reducing the productive time lost as a result of machines being down.

Safety and savings tip!

Illustrated—a few of many types of Sylphon Packless Valves. Sizes range from ⅛" to 6". No. 304-NV is especially suited for vacuum service.

Sylphon Packless Valves prevent leakage—in or out

● Once Sylphon Packless Valves are installed on pipe lines carrying gasoline, oil, or other volatile liquids and vapors, leakage stops instantly! You and your equipment are protected against possible fire, explosion or other damage. You gain more, too. For these valves prevent wastage—provide vacuum protection.

There's no packing to leak or replace. A rugged, seamless Sylphon metal bellows replaces customary packing. The bellows eliminates leaks that might seep past the stuffing box of even the best packed type valve. It seals the valve stem against corrosive, dangerous or inflammable liquids or gases.

Many sizes and types made of brass, monel, stainless steel, etc. Widely used in chemical plants, oil refineries, power plants, aboard ships. Ideal as standard equipment. Get complete information; write for Bulletin CF-813.

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DIVISION

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Canadian Representatives, Darling Brothers, Montreal

NOT WOVEN...NOT WELDED...BUT

STURDY SOLID STEEL

It's your material of a thousand and one uses—Wheeling Expanded Metal, a solid plate of sturdy steel that's been pierced and stretched. Strong, light, readily passing both light and air, it is literally "solid steel you can see through!" Shown here are but a few of thousands of articles fabricated for greater strength-plus-lightness from this wonder material. For full engineering data, write us today!

WHEELING EXPANDED METAL

WHEELING CORRUGATING COMPANY

WHEELING, WEST VIRGINIA

Atlanta Louisville · Boston Minneapolis · Buffalo New Orleans · Chicago New York · Columbus Philadelphia · Detroit Richmond · Kansas City St. Louis

YOU MUSTN'T MISS—

Begins on page 214

"There is greater efficiency in simplification. Keep operations simple, avoid complications. There are a lot of experts who are selling complications, but not enough are selling simplification.

"The key to increased production is people. It would be presumptuous for me to talk to you about employee relations. You know from experience that if there can be instilled in the worker the will to work, to do the maximum day's work, it will do more to increase production than anything.

"Many elderly workers, more women workers will have to be brought back into our plants.

"Then there is an enormous labor reserve in overtime that can be used. The huge production of American industry this year has been achieved on a work week of 39.7 hours for labor. Overtime is expensive labor, but many of you will find it necessary to use it in the months ahead.

"It would be well to be certain that we have the right executives in the right spot. Then give them ample responsibility and authority. It is more important than ever that we train and develop our department heads and junior executives.

"The most important single individual in this striving for enlarged production is the foreman. Most of us have been showing increased appreciation of our foremen. There should be increased communication between the foreman and his boss. He should be consulted frequently and stimulated to seek improved production methods."—*Richard S. Reynolds, Jr.*, president, Reynolds Metals Company, speaking before the Production Conference of the American Management Association in Chicago.

Subcontractors Are Important

"We are once again involved in a defense effort, and it is a matter of increasing importance that [effective] subcontracting programs be developed. Once these programs are established, it will make possible an almost immediate expansion into maximum production in the event that industry is once again

American Blower . . . a time-honored name in air handling

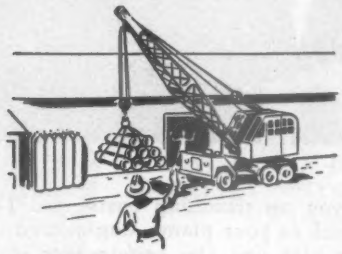
Baltimore, too, has a conveniently located American Blower Branch Office to provide you with data and equipment for air handling. You can reach American Blower in Baltimore by calling Saratoga 0448. In other cities, consult your phone book.

BETTER FABRICS . . .

Fine yarn filaments, strong plump fibers —these are the marks of a good textile mill. And, in many top mills, you'll find American Blower equipment helping in the control of inside temperature and humidity. For example, several of our large AHS Fans were ordered recently by an important Southern mill. The thing operators like about these fans is their non-overloading power characteristics and their remarkable efficiency over a wide range (which saves them money). May we help you with a similar problem?

HOSPITAL COMFORT . . .

A new Veterans' Hospital is going to be mighty comfortable—at least when it comes to ventilation. Reason—34 American Blower Sirocco Fans which were recently installed. These fans deliver more air per revolution than any other type of fan, operate at lower tip speeds, are unusually quiet, save power and require only a minimum of space for installation. For the best in air handling equipment, call American Blower.



POWER SAVER . . .

If you're concerned with power transmission, you'll want to know about our Gyrol Fluid Drives. Developed originally for use with mechanical draft fans, Gyrol Fluid Drives are today widely used in industry. They offer three important advantages—smoother acceleration, overload protection and substantial power savings. One company uses Fluid Drives on a crane that picks up acetylene tanks. Before they were installed, the tanks got such a violent swing from the quick start they would often damage building walls. Since using the Fluid Drives, they've had no trouble.

MAY WE SERVE YOU?

American Blower heating, cooling, drying, air conditioning and air handling equipment can do much toward improving comfort and efficiency in business. For data, phone or write our nearest branch office.

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Ventura Fans

Air Conditioning Equipment

Gyrol Fluid Drives

Industrial Fans

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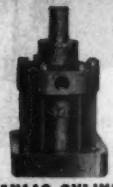
CANADIAN SIROCCO COMPANY, LTD., WINDSOR, ONTARIO

Division of American Radiator & Standard Sanitary Corporation

YOUR BEST BUY AMERICAN BLOWER AIR HANDLING EQUIPMENT

Serving home and industry: AMERICAN-STANDARD • AMERICAN BLOWER • CHURCH SEATS • DETROIT LUBRICATOR • KEWANEE BOILERS • ROSS HEATER • TONAWANDA IRON


HYDRAULIC CYLINDERS

AIR CYLINDERS

RIVITORS

CLINCHORS

CUTTERS

AIR CONTROLS

A tip for you on trimming costs—put T-J products to work in your plant! Engineered to *save labor* and give you *plus performance* in a wide range of applications.

For those "muscle jobs" of pushing, pulling or lifting—100 lb. or 50,000 lb.—save money by mechanizing with T-J Air and Hydraulic Cylinders! For high production in rivet-setting, specify T-J Rivitors with automatic feeding and setting . . . air or electric power. For setting clinch nuts in automotive body panels, door locks and other products . . . set 'em 3 to 5 times faster with T-J Clinchors! For more work between grinds in tough die steels . . . T-J Cutters! For accurate, automatic control of presses, brakes, other machines and equipment . . . T-J Air Controls.

That's it—get T-J *all the way* for tough jobs! Send for latest catalogs. The Tomkins-Johnson Co., Jackson, Mich.

T-J 34 YEARS EXPERIENCE
TOMKINS-JOHNSON
RIVITORS AIR AND HYDRAULIC CYLINDERS CUTTERS CLINCHORS

YOU MUSTN'T MISS—

Begins on page 214

called upon to engage in full war production.

"In our overall economy, the subcontracting system is an excellent means of spreading the benefits of large contracts on a broad geographical basis and in a minimum of time.

"This makes for minimum vulnerability in case our nation should ever be struck by a bombing attack. With multiple sources of supply, production of important war material will not be knocked out completely by the potential destruction of one area.

"Both large and small companies benefit from the subcontracting system. The large prime contractor needs the specialized techniques of the subcontractor in order to augment his own production program. On the other hand, the smaller firm can participate as a member of a team in major government programs, programs which he could not handle alone because of incomplete facilities.

"Furthermore, the subcontractor in this way can avail himself of the engineering, manufacturing, and procurement 'know-how' of the prime contractor, and can eventually develop himself into the position of a potential prime contractor."—*Harry L. Ehrlicher*, vice president in charge of purchasing and traffic, General Electric Company, speaking before a meeting of American Management Association.

Don't Pass the Buck to Personnel

"It is quite understandable that foremen, superintendents, and works managers, busy as they are with operating problems, should have looked upon the personnel department as a handy receptacle for troubles that they should care for themselves. It is so easy to tell an employee dissatisfied with his job or pay that he should see the personnel manager.

"The success of the personnel program is not primarily the responsibility of the personnel department but of those who occupy operating positions. The personnel department should merely facilitate and counsel. Each line supervisor should consider himself a personnel executive and be conscious of the desires, emotions, and differ-

this v-belt inventory is unnecessary

Standardize on Veelos—the adjustable v-belt—and *eliminate* the storage problem, the control problem and the "tied-up" money problem that is usual in maintaining a full stock of endless v-belts.

this stock of VEELOS replaces up to 316 sizes of endless v-belts

Four reels of Veelos can take care of *every* v-belt need in the O, A, B and C widths. V-belt control is simplified, only a minimum storage space is needed and inventory-dollars are kept at rock bottom.

this VEELOS v-belt drive steps up production

Veelos supplies vibrationless, full power delivery and can be simply and easily adjusted to maintain uniform tension on all belts. Veelos can be installed quickly . . . even without dismantling outboard bearings.

this handy Veelos Data Book

should be in your files ready for instant reference . . . It contains the facts on Veelos V-Belts. Write for your copy now.

VEELOS
THE LINK
V-BELT

ADJUSTABLE TO ANY LENGTH • ADAPTABLE TO ANY DRIVE

Made in all widths in three types: regular, oil-proof, static conducting. Also double V in A and B. Packaged on reels in 100-foot lengths. Sales engineers in principal cities; over 350 distributors throughout the country. VEELOS is known as VEELINK outside the United States.

MANHEIM MANUFACTURING & BELTING COMPANY, MANHEIM, PA.

the plant manager blew his top

When the foreman of Dept. C reported a big rise in grinding cost there really were fireworks. Don't let this happen in your plant. Call in a Simonds Abrasive Company engineer now. Chances are his survey will point the way to better efficiency. Even slight wheel changes often make the difference. It costs you nothing to find out. Write today.

SIMONDS ABRASIVE CO.

Grinding Wheels

EXECUTIVES — *Simonds Abrasive Company's complete line has everything you need . . . grinding wheels, mounted points and wheels, segments and abrasive grain.*

SIMONDS ABRASIVE COMPANY, PHILADELPHIA 37, PA. DISTRIBUTORS IN PRINCIPAL CITIES

Division of Simonds Saw and Steel Co., Fitchburg, Mass. Other Simonds Companies: Simonds Steel Mills, Lockport, N. Y., Simonds Canada Saw Co., Ltd., Montreal, Que. and Simonds Canada Abrasive Co., Ltd., Arvida, Que.

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YOU MUSTN'T MISS—

Begins on page 214

ences in ability of those who work under his direction. The execution of the personnel policy must rest with those who are in direct contact with workers."

Canby Balderston, dean of Wharton School of Finance and Commerce, University of Pennsylvania, speaking before Industrial Management Conference at University of Missouri.

Labor Relations—British Style

"Britain's Labor government is flunking a course in which it should be getting straight A: Labor relations.

"Two-thirds of the time lost through British industrial disputes during the past two years has been lost in nationalized industries—in the mines, docks, railways, road transport, and gas plants. Yet government-run industries represent only one-fifth of the entire British economy. That means labor disputes are nearly ten times as numerous in the socialist's domain as in the much wider sector of private enterprise.

"These stoppages have all been 'unofficial strikes.' There are no official strikes because the right to strike has been abolished by law.

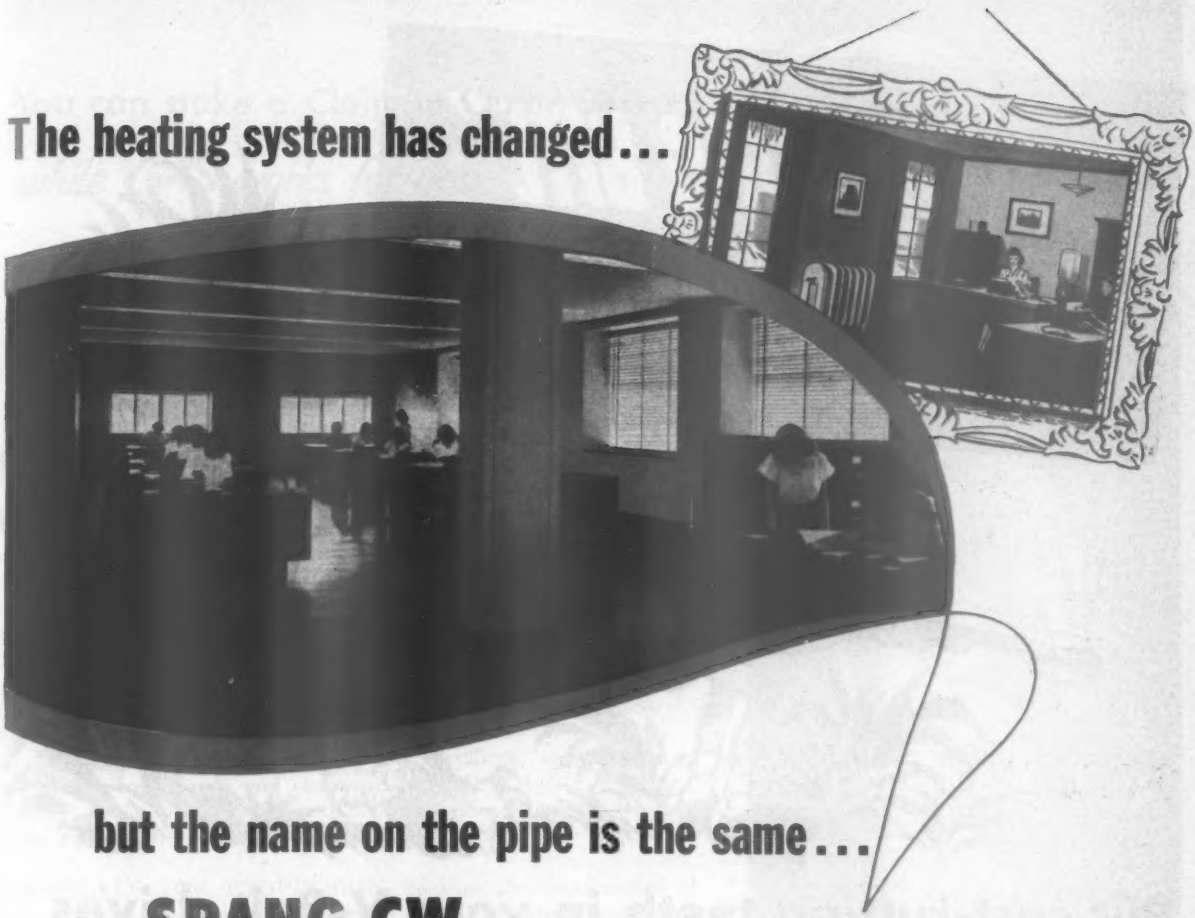
"The two most recent unofficial strikes of significant size were those of the London bus drivers and conductors in September and the London gas workers in October.

"The gas strike was broken after Navy personnel were sent by the government to man the affected plants, and after ten of the strikers were sentenced to a month in jail.

"These are ironic methods, to say the least, for a Labor government to use against labor on strike. Imagine what cries of anguished protest would have been raised if the government in capitalist America used troops to break a strike and then jailed the strikers. The irony becomes more pointed when it is remembered that these workers were striking against nationalized industries which they theoretically own, since they are 'the people.'"

Warren H. Phillips, head of the London Bureau, Wall Street Journal, in an editorial.

The heating system has changed...



but the name on the pipe is the same...

SPANG CW

When you're planning and laying-out radiant heating systems, be sure to specify "Steel Pipe" . . . and to be sure of top-quality, specify "Spang CW Steel Pipe".

You'll like working with Spang CW Steel Pipe. It's uniform in quality, mill-tested, easy to cut, bend and weld. It's strong to withstand mechanical pressure, and rough handling. It stands up for a lifetime in closed-circuit systems.

Even when wet-system central heating was a novelty, Spang was a famous name in pipe . . . it's been famous for 110 years.

And today's great demand for Spang CW Steel Pipe . . . greatest in our long history . . . makes it difficult for your supply house to fill all orders as quickly as they'd like to. But keep in touch with them . . . you can depend on them to do their best for you.

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STEEL PIPE

QUALITY

that is recognized wherever pipe is used

Take a "BIG BITE" out of Power Costs

Put cost-cutting teeth in your V-Belt drives with DAYTON COG-BELTS*

★ 40% MORE H. P. PER BELT ★ FEWER BELTS
★ FEWER PULLEY GROOVES ★ LONGER BELT LIFE

Costs of power transmission come tumbling down with the premium Dayton Cog-Belt. Original cost is less. 5 Dayton Cog-Belts with rayon cords do the work of 7 ordinary V-Belts.

You save drive space. Cog-Belts let you use shorter center-to-center pulley distances — as much as 25% shorter.

Cogs are the only V-Belts scientifically built to bend, like your finger. They withstand flexing and compression strains better, run cooler, last longer.

To save money and drive space, get Dayton Cog-Belts. Ask your Dayton Distributor.

"Cog-Belts on the ball!" says Maintenance Man

Swedish ball grinders were chewing up steel cable V-Belts in 4 to 5 weeks. Reasons: small motor pulleys, and oil. Dayton BX60 Cog-Belts were tried on one machine, *more than doubled* best previous belt life. Now Cogs drive all the ball grinders. "Cogs are really on the ball!" says the company engineer.

DAYTON RUBBER COMPANY, DAYTON 1, OHIO

V-Belts by **Dayton Rubber**

*T. M.

WORLD'S LARGEST MANUFACTURER OF V-BELTS

You can stake a Claim in Outer Space

while GAS works for you in Research and Production

YOUR HORIZONS ARE UNLIMITED because science breaks thru every boundary of space and time with new materials and new methods. In laboratories and production-lines where the work on rockets and atoms is carried out, GAS performs myriad tasks to facilitate your explorations in outer space, to validate your stake in the regions beyond the earth.

RESEARCH COMES FIRST in this vast project. Gas plays its first important role in the laboratory. Here the versatility of Gas is demonstrated by its use in stills, ore roasters, Bunsen burners, blow pipes, evaporators, combustion furnaces, dryers. These few uses are but a prelude to even more vital tasks for Gas when laboratory findings reach—

THE MANUFACTURING STAGE where the metals required for actual explorations are produced. First in iron, steel, copper, silver—then in aluminum, magnesium, beryllium, molybdenum, and other rarer metals and elements, the role of Gas in refining, alloying, fabricating expands with each new heat-processing requirement. Then we need large quantities of—

CHEMICALS FOR PROPULSION, because the penetration of outer space is a complete operation in which delicate processes are developed on a vast scale. Once again Gas supplies the heat and frequently the combustion by-products for desiccating, calcining, melting, catalytic conversions, assaying. Aside from the actual processing, Gas has also played its vital part in the development and manufacture of the control equipment for these manufacturing operations, and for the actual explorations.

IN YOUR OWN RESEARCH AND PRODUCTION, even though you may not be concerned directly with these quests in outer space, you'll find versatile Gas a most valuable and dependable tool. Since the expanding role of Gas is almost as unlimited as your horizons in outer space, you'll find it worthwhile to investigate this essential fuel.

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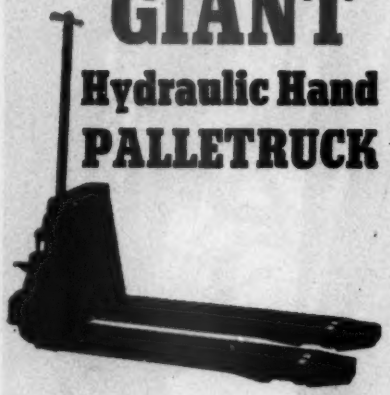
Hydraulic Hand
PALLETRUCK



Good-bye to grunts and groans! This powerful hydraulic pallet lift truck is easy to push, easy to pull. Slide planes lift or lower forks for smooth entry into or exit from double faced pallets. Handle pumping is simple . . . quick . . . takes little effort. Model shown has two-ton capacity. One-ton Red Giant Palletruck also available. Fill in coupon for fact-packed bulletin. Do it now!

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DESIGNERS AND MANUFACTURERS OF MATERIAL HANDLING EQUIPMENT
8765 Tonnele Ave., North Bergen, N. J.
Since 1904

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RE100

DIRECTORY OF MOBILIZATION AGENCIES

AS EXPECTED, mobilization has brought a new crop of alphabetical agencies to Washington. In the latest reshuffle—and Chief Mobilizer promises more shuffling "in the months ahead"—Washington has already found itself running out of initials. We now have two ODM's—Office of Defense Mobilization and Office of Defense Manpower — and two DPA's — Defense Production Administration and Defense Power Administration.

To help you decipher the barrage of initials from Washington, here's a list of the more important mobilization agencies, together with a brief description of the functions of each.

AGENCIES RESPONSIBLE TO THE PRESIDENT

NSC—National Security Council. Top-level advisor on "integration of domestic, foreign, and military policies." Members: President; Vice President; Secretaries of State and Defense; Chairman of NSRB.

NSRB — National Security Resources Board. Presidential advisor on "coordination of military, industrial, and civilian mobilization." Chairman: W. Stuart Symington. Members: Secretaries of State, Treasury, Defense, Interior, Agriculture, Commerce, and Labor.

CEA—Council of Economic Advisors. "Develops and recommends to the President national economic policies." Chairman: Leon H. Keyserling. Members: John D. Clark, Roy Blough.

ODM—Office of Defense Mobilization. The top mobilization agency. Coordinates and controls all activities relating to materials, manpower, economic, and (*to an indefinite extent*) procurement matters. Director: Charles E. Wilson.

AGENCIES REPORTING DIRECTLY TO OFFICE OF DEFENSE MOBILIZATION

ESA — Economic Stabilization Agency. Overall direction of price and wage stabilization. Administrator: Eric Johnston.

DPA — Defense Production Administration. Exercises "direction and control over defense production activities," as follows:

1. Establishes overall production priorities.
2. Decides program feasibility.
3. Sets production program goals.
4. Determines scope of production expansion.
5. Estimates labor supply requirements for production programs.
6. Represents U. S. on combined (international production) boards.
7. Secures production plans from all agencies and develops methods and procedures for their execution.

Administrator: Wm. H. Harrison

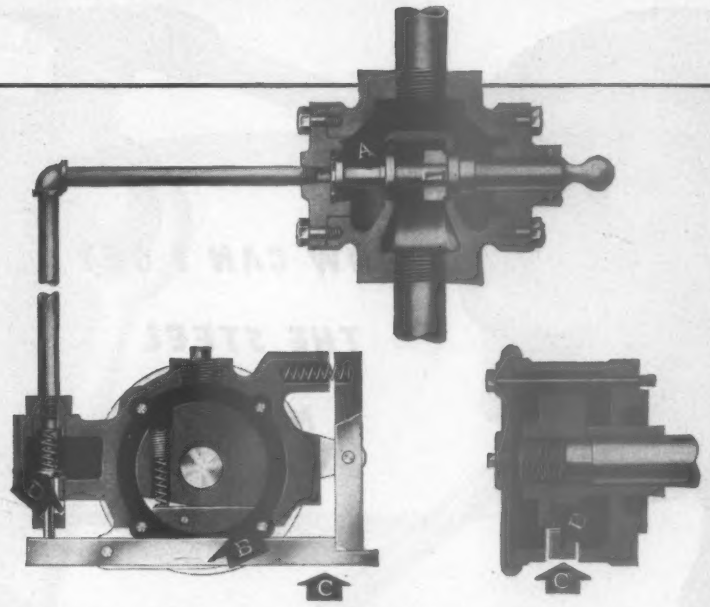
DMB — Defense Mobilization Board. Advises the Director of Office of Defense Mobilization. Chairman: Director of ODM. Members: Secretaries of Treasury, Defense, Commerce, Interior, Agriculture, and Labor; Chairmen of the NSRB and RFC; Board of Governors of the Federal Reserve System.

AGENCIES REPORTING TO ECONOMIC STABILIZATION AGENCY

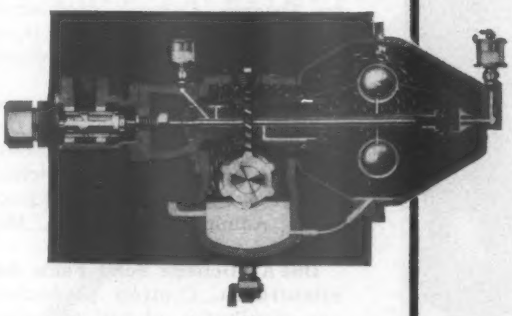
OPS—Office of Price Stabilization. Establishes and administers price controls on all products except food (specifically exempted from control by Defense Production Act of 1950). Director: Michael V. DiSalle.

WSB—Wage Stabilization Board. Makes recommendations on wage stabilization to ESA Administrator. (May soon be given authority to administer national wage stabilization policy.) Chairman: Cyrus Ching. Members: 2 public, 3 industry, 3 labor.

Only Coppus Turbines offer you *a pilot operated* excess speed safety trip



The constant speed governor on Coppus Turbines, plus this Excess Speed Safety Trip, gives you extra protection for your turbine investments. Here's how it works. When steam is turned on, pressure opens valve A fully. When excess speed is reached, centrifugal force throws weight B against lever C lifting pilot valve D. This releases pressure in back of valve A, closing this valve instantaneously, to shut off the steam. Safety trip can be tested easily while turbine is running by manually tripping and resetting lever C.



Sectional view showing lubricating system of fully enclosed Coppus Constant Speed Governor. Governor head acts directly on stem of steam admission valve. No external levers required. Ball bearing construction eliminates end play and gives frictionless operation.

Coppus Turbines ranging from 150 hp down to fractional in 6 frame sizes

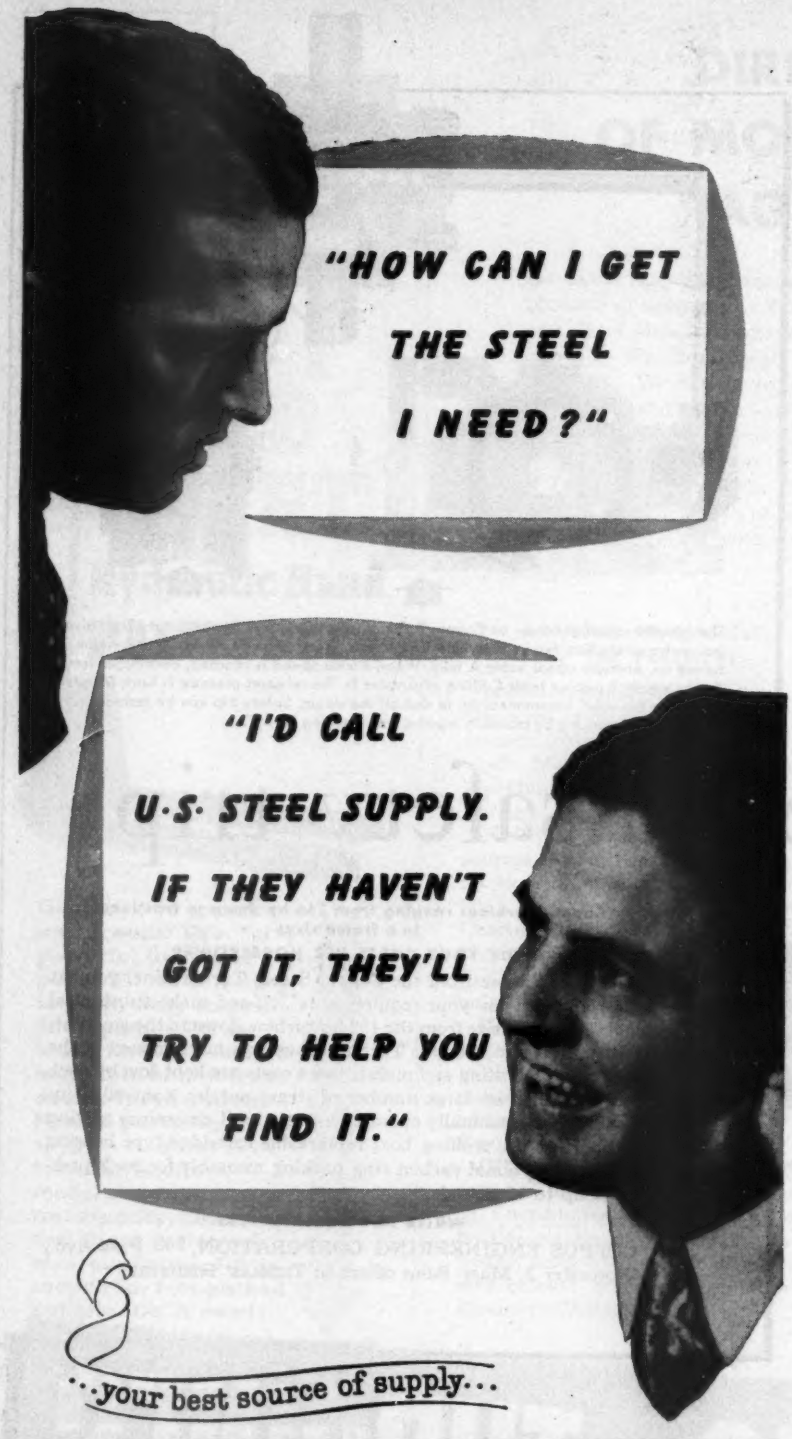
CUT YOUR COSTS PER HORSEPOWER

When you choose from the Coppus Steam Turbine line, you get the right size for your requirements . . . and make substantial savings on *any* size from the 150 hp turbine down to the smallest. Low in first cost, Coppus Turbines save you more money in the long run. Operating and maintenance costs are kept low by such other features as: large number of steam nozzles, controlled individually by manually operated valves; hard chromium plating on shaft at the stuffing box; replaceable cartridge type bearing housings; optional carbon ring packing assembly for back pressures up to 75 pounds.

WRITE FOR BULLETIN 135

COPPUS ENGINEERING CORPORATION, 102 Park Ave., Worcester 2, Mass. Sales offices in THOMAS' REGISTER.

COPPUS "BLUE RIBBON" TURBINES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"I'D CALL U·S· STEEL SUPPLY. IF THEY HAVEN'T GOT IT, THEY'LL TRY TO HELP YOU FIND IT."
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USS

UNITED STATES STEEL

DIRECTORY OF MOBILIZATION

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AGENCIES SUBJECT TO "DIRECTION AND CONTROL" OF DEFENSE PRODUCTION ADMINISTRATION

Within the Dept. of Commerce—

NPA—National Production Authority. Controls production and distribution of all industrial products (except as otherwise designated). Administrator: Manly Fleischmann. See separate listing below for operating divisions of NPA.

CAA—Civil Aeronautics Administration. Controls air transport. (*Do not confuse with the independent CAB, Civil Aeronautics Board, not part of defense setup.*) Chairman: Delos W. Rentzel.

MA — Maritime Administration. Controls shipbuilding and overseas shipping. Administrator: J. T. Koehler, Acting.

Within the Dept. of the Interior—

DMA—Defense Minerals Administration. Controls production and distribution of defense minerals up to the smelter or blast furnace (at which point NPA takes over). Administrator: James Boyd.

PAD—Petroleum Administration for Defense. Controls production and distribution of petroleum and petroleum equipment. Administrator: Bruce K. Brown.

DPA—Defense Power Administration (*do not confuse with Defense Production Administration*). Controls production and distribution of electric power and equipment. Administrator: C. B. McManus.

DSFA—Defense Solid Fuels Administration. Controls production and distribution of coal and coal-burning equipment. Administrator: Charles W. Connor.

Within the Dept. of Agriculture—

PMA — Production and Marketing Administration. Controls production and distribution of food for industrial uses subject to DPA. *Not* subject to DPA, PMA also controls food for human and animal consumption, farm equipment, and commercial fertilizer. Administrator: Ralph S. Trigg.

Within the Interstate Commerce Commission—

DTA — Defense Transport Authority. Controls domestic rail and

This Firefighter can be two places at once!

You can protect several danger spots at one time with a Kidde built-in carbon dioxide fire extinguishing system. ¶ Widely separated fire hazards... even on different floors can be protected by a single Kidde system. If fire strikes a protected space, directional valves rush fire-smothering carbon dioxide gas to the stricken area. The same CO_2 can set off mechanisms to shut doors and windows... turn off fans and machinery. After doing its job, the clean, dry CO_2 evaporates completely. ¶ Whatever your fire detection and protection problem may be, a Kidde expert will be glad to help. When you think of CO_2 call Kidde.

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AUTOMATIC
GAS UNIT HEATERS

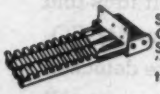
Completely Self Contained . . . Eliminates Boiler Equipment, Fuel Storage, Steam or Water Lines.

Reduce your heating costs with a Humphrey Gas Unit Heater. Get fast, clean heat, effectively circulated by forced air action.

Economical to install with "maintenance-free" operation... the Humphrey is the ultimate in efficiency. Suspended from ceiling, Humphrey Unit Heaters leave entire floor space for productive facilities.

Ideal for factories, offices, warehouses and garages. Write today for illustrated folder.

"Compare These EXCLUSIVE Humphrey Features."



SUPER COMBUSTION CHAMBER — Stainless Steel Alloy lifetime "dual flame" burner tips.

POSITIVE SAFETY CONTROLS — Basoid Safety Pilot shuts off gas in case of pilot outage. Overload control eliminates over heating.

ADJUSTABLE LOUVERS — Horizontal or vertical louvers control angle of heat flow.

FREE FLOW HEAT EXCHANGER — Electrically welded, heavy steel . . . gas tight . . . needs no cleaning . . . no baffles to impede flow.

GENERAL GAS LIGHT CO.
KALAMAZOO, MICHIGAN

DIRECTORY OF MOBILIZATION

Begins on page 238

road transport, storage, and warehousing. Administrator: William Knudson.

Independent fiscal agencies (certain activities subject to DPA)

FRB — Federal Reserve Board (*now properly, Board of Governors of the Federal Reserve System*). Sets policies and acts as fiscal agency. Chairman: Thomas B. McCabe.

RFC — Reconstruction Finance Corporation. Makes loans to finance expansion of defense production. Chairman: Harley Hise.

GSA—General Services Administration. Makes purchases on behalf of other agencies. Administrator: Jess Larson.

AGENCIES SUBJECT TO "COORDINATION" BY OFFICE OF DEFENSE MOBILIZATION

MB — Munitions Board. Stock piles strategic materials; coordinates military procurement and production programs. Chairman: John D. Small. (*Dept. of Defense*)

ODM—Office of Defense Manpower (*do not confuse with Office of Defense Mobilization*). Makes plans, programs, policies to utilize manpower for defense needs. Director: Robert C. Goodwin. (*In Department of Labor*)

FRB — Federal Reserve Board (*second listing*). Controls consumer credit. Chairman: Thomas B. McCabe.

HHFA—Housing and Home Finance Agency. Controls real estate construction credit. Administrator: Raymond M. Foley.

AEC — Atomic Energy Commission. Controls all matters relating to production of atomic energy. Chairman: Gordon Dean.

FSA—Federal Security Agency. Administers all federal welfare activities. Administrator: Oscar R. Ewing.

NACA—National Advisory Committee for Aeronautics. Makes policies for aeronautical development. Chairman: Jerome C. Hunsaker.

RDB — Research and Development Board. Plans and coordinates military research programs. Chairman: William Webster.

PRINCIPAL DIVISIONS OF NATIONAL PRODUCTION AUTHORITY

Office of Small Business—James L. Kelly

More on next page

COLD-ROLL-FORMING

GIVES "SUNDAY PUNCH" TO RISING COSTS!

Among all methods of cold-shaping flat rolled metal, cold-roll-forming results in the lowest conversion cost. Material cost, too, is greatly reduced when making specially designed channel, tubular and other sections, combining light weight with great rigidity and strength.

A third economical feature is that the rolls continuously pull the stock into and push it out of the machine, providing cost-free materials handling.

Roll-forming may be combined with many other operations such as prenotching, edge-trimming, perforating, embossing, welding, coiling, curving and cutting-to-length, at little or no extra labor cost.

Normal speed of 100 f.p.m. does not sound like much, but it means upwards of 30,000 feet per day, 10,000,000 feet per year, *with only one operator.* Obviously such a machine will earn big dividends even when operated only a few days per month.

Investigate! 86-page book of information on Cold-Roll-Forming sent on request. Consultations and estimates without cost or obligation.

THE YODER COMPANY
5513 Walworth Avenue • Cleveland 2, Ohio

COLD FORMING
YODER
SLITTING AND
TUBE MILL MACHINERY

"Get a

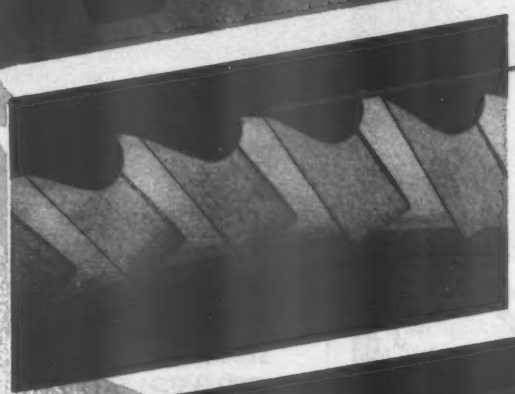
SIMONDS SAW

Job-designed

for fast, low-cost Cold Cutting"

Inserted Tooth Saws

Full high-speed steel teeth for long wear, securely held in a tough alloy steel plate, make this the top production saw for heavy duty cutting. The teeth hold their cutting edges at high temperatures, permitting feeds of nearly double those of solid saws on ferrous and non-ferrous metals. All teeth are perfectly ground to side, top and down clearances, and are easily replaced.



Segmental Saws

Combining solid-tooth thinness with inserted-tooth economy, this saw leaves a remarkably smooth finish. In finer teeth, possible with this design, it is especially effective cutting thin-walled sections. Alternate square and beveled fitting splits the chips three ways for easier cutting. Available with carbide-tipped teeth.

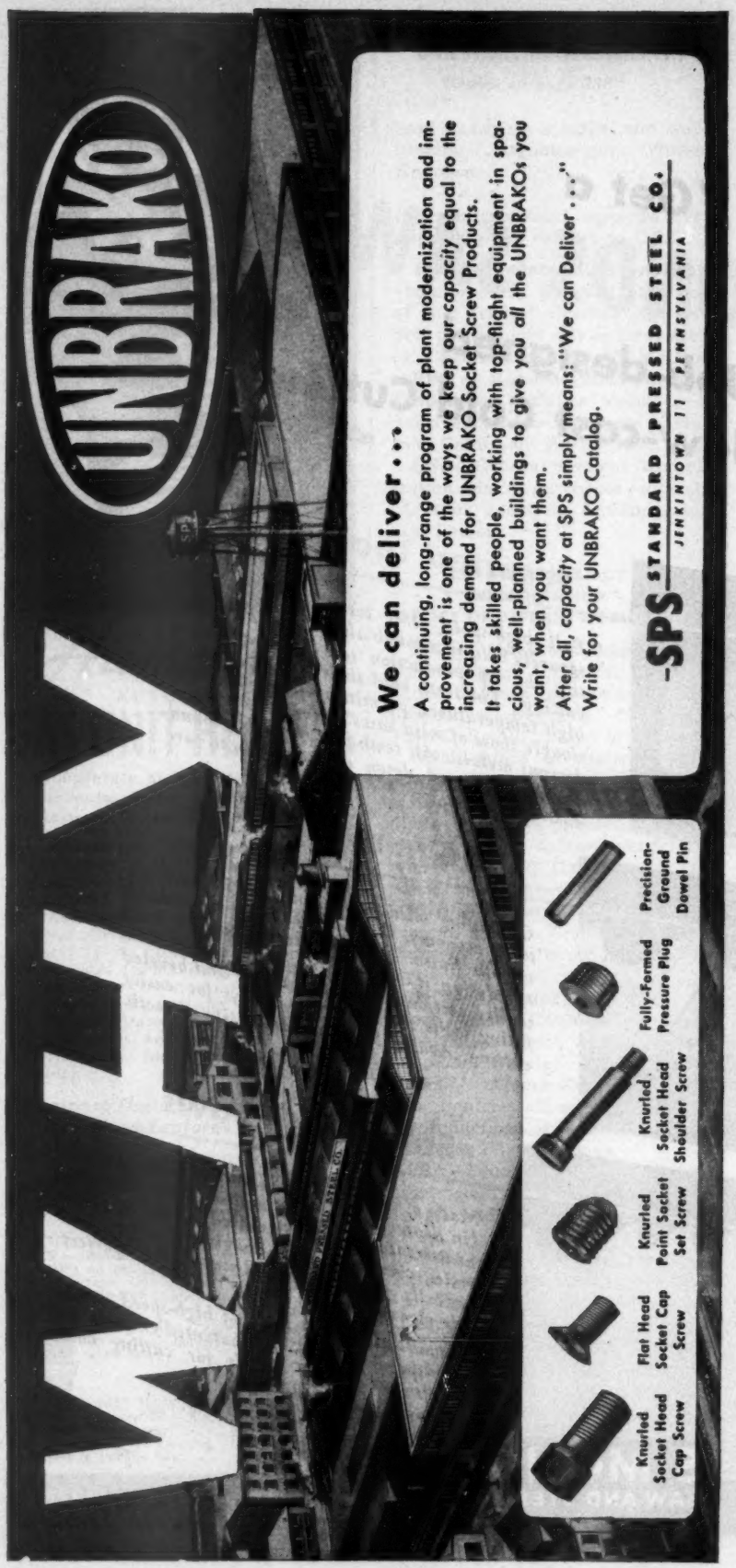
Solid Tooth Saws

Made of semi-high-speed and high-speed steels (in diameters 16" and under), these saws are heat-treated for maximum edge-holding properties combined with toughness. They are radially ground on special machines for perfect side clearance.

Simonds also makes saws of high-speed, semi-high-speed and T-11 (patented) steels to operate at higher speeds for cutting non-ferrous metals.

SIMONDS
SAW AND STEEL CO.
FITCHBURG, MASS.

Branch Offices in Boston, Chicago, San Francisco and Portland, Ore. Canadian Factory in Montreal, Que.


WHY
UNBRAKO
We can deliver...
A continuing, long-range program of plant modernization and improvement is one of the ways we keep our capacity equal to the increasing demand for UNBRAKO Socket Screw Products.
It takes skilled people, working with top-flight equipment in spacious, well-planned buildings to give you all the UNBRAKOs you want, when you want them.
After all, capacity at SPS simply means: "We can Deliver . . ."
Write for your UNBRAKO Catalog.
-SPS STANDARD PRESSED STEEL CO.
JENKINTOWN 11 PENNSYLVANIA
Knurled Socket Head Cap Screw
Flat Head Socket Cap Screw
Knurled Point Socket Set Screw
Knurled Socket Head Shoulder Screw
Fully-Formed Pressure Plug
Precision-Ground Dowel Pin

DIRECTORY OF MOBILIZATION

Begins on page 238

Office of Facilities and Construction—Frank R. Creedon.
Office of Civilian Requirements—Nelson Miller
Controlled Materials Plans—Walter Skuce
Industry Operations Bureau—H. B. McCoy

INDUSTRY DIVISIONS

Building materials
Chemicals
Copper
Electronics
Forest products
Iron and steel
Subdivisions: Stainless; pig iron; alloy, cold drawn bars; rails and accessories; pipe and tubing; tool steel; plant expansion; tin plate; structural shapes; iron and steel castings; wire; ferro-alloys; structural plates; iron and steel scrap; sheet and strip; bars and semi-finished; forgings and castings; nickel; cobalt; metallurgical; warehouse; priorities.
Light metals
Subdivision: Aluminum.
Machinery
Subdivisions: Machine tools; industrial machinery; materials handling equipment; valves and fittings; service industry machinery; construction, mining, oil field machinery; electrical machinery; farm machinery; printing and publishing machinery.
Petroleum equipment
Power equipment
Protective equipment
Rubber
Technical and scientific supplies
Textiles & leather
Tin, lead, zinc
Subdivisions: Tin, antimony, lead; zinc and cadmium.
Transportation equipment
Subdivisions: Automotive; railroad; aircraft; shipbuilding, boats; automotive maintenance equipment; railroad motive power.

Believe it or not, there are still more agencies in Washington. FACTORY will publish an additional list next month.

...THE INSIDE STORY OF THE "FLYING DISCS"...

People say that they've seen flying discs.

They say they're bright shiny metal, 90 feet in diameter, and travel at incredible speeds. Reports about them always seem to make page one.

Another kind of "flying disc" that never rates a headline is made of black wax. It's about 16 inches in diameter, and it, too, flies at incredible speeds.

We're speaking of radio transcriptions that fly by Air Express.

They don't get page-one mentions because, by now, the idea of flying discs to the various stations is commonplace to the radio industry. The time they save permits them to keep their recorded broadcasts right up to the minute.

But, you don't have to be in radio to profit from the regular use of Air Express. Here are unique advantages which any business can enjoy:

IT'S FASTEST—Air Express gives the fastest, most complete door-to-door pick up and delivery service in all cities and principal towns, *at no extra cost.*

IT'S MORE CONVENIENT—One call to Air Express Division, Railway Express Agency, does it all.

IT'S DEPENDABLE—Air Express provides one-carrier responsibility all the way and gets a *receipt upon delivery.*

IT'S PROFITABLE—Air Express expands profit-making opportunities in distribution and merchandising.

Like to know more? Call your local Air Express Division of Railway Express Agency.

AIR EXPRESS

GETS THERE FIRST

LEWIS-SHEPARD

Making Light of the Dark!

Customer's Requirement: An electric truck which one man could operate in the dark, in aisles too narrow for right angle turns. It had to pick up 1500 lb. rolls from either side; then lift and deposit them accurately on any one of 5 rack levels. All in a room to hold 1200 such rolls, — *and* — *all to be done in total darkness!*

You can be sure that the same superior engineering skill and quality of manufacture which built this "special" machine also go into every product in The "Master" Line.

MULTIPLY MANPOWER · LEWIS-SHEPARD ·

The "MASTER" Line

WRITE, PHONE or WIRE . . . describing *your* type of handling problem and we will send you our latest catalog,—or have a qualified L-S representative call.

The "MASTER" Line
LEWIS-SHEPARD
LEWIS-SHEPARD PRODUCTS INC., 314 WALNUT ST., WATERTOWN 72, MASS.
Midwest Plant: CRAWFORDSVILLE, INDIANA
Consult Your Yellow Phone Book
Sales-Service In Principal Cities

WIRE ROPE

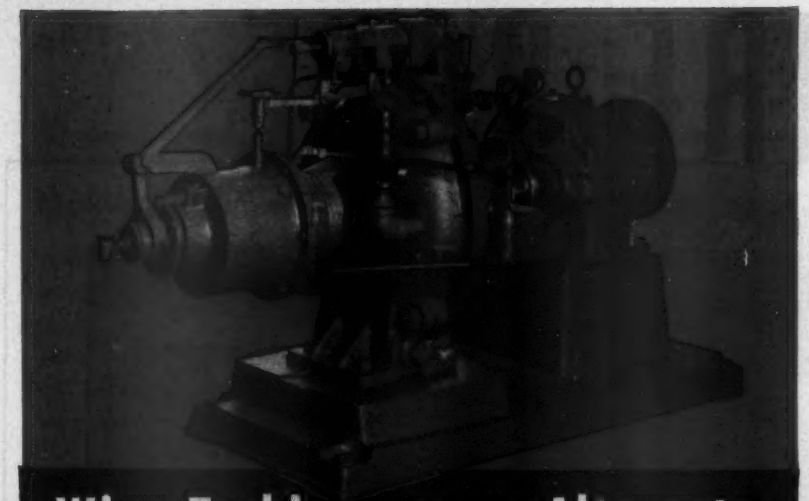
Production men specify Roebling Preformed for longer life . . . lower costs

FOR EASY HANDLING, extra toughness and service life, there's nothing like Roebling Preformed "Blue Center" Steel Wire Rope. "Blue Center" steel—made only by Roebling—gives rope top resistance to abrasion and fatigue. And Roebling Preforming gives you a rope that spools better... doesn't tend to set or kink... minimizes vibration and whipping.

There is a Roebling wire rope of the right construction, grade and size for every type and make of rope-rigged equipment. Have your Roebling Field Man help choose the rope that will give you the best, low-cost performance. Further savings may be effected by following his suggestions on installation, use and maintenance of wire rope. John A. Roebling's Sons Company, Trenton 2, N. J.

ROEBLING

Atlanta, 934 Avon Ave ★ *Cambridge*, 31 Carleton St ★ *Chicago*, 5525 W. Roosevelt Rd ★ *Cincinnati*, 3253 Fredonia Ave ★ *Cleveland*, 701 St. Clair Ave, N.E. ★ *Denver*, 4801 Jackson St ★ *Houston*, 6216 Navigation Blvd ★ *Los Angeles*, 216 S. Alameda St ★ *New York*, 19 Rector St ★ *Odessa, Texas*, 1920 E. 2nd St ★ *Philadelphia*, 230 Vine St ★ *San Francisco*, 1740 17th St ★ *Seattle*, 900 1st Ave, S. ★ *Tulsa*, 321 N. Cheyenne St



Wing Turbines as an Alternate Source of Auxiliary Drive

The use of turbines as an alternate source of auxiliary drive is good business in these days of urgent production and uncertain industrial conditions. When electric motor drive is subject to power failures due to strikes, fires, floods, hurricanes (or bomb attack), the ability to continue with steam auxiliaries is an advantage that is worth many times the cost of the alternate equipment. And the use of Wing Steam Turbines for such services as pumps, compressors, fans, blowers, generators, etc., can cut power costs by acting as a reducing valve on boiler steam for use in process and heating.

L. J. Wing Mfg. Co.

162 Vreeland Mills Road, Linden, N.J.

Canadian Factory: Montreal, Canada

Write for a copy of Bulletin SW-50

WING

Wing

AUXILIARY TURBINES

NEW MATERIALS

DESCALE OR DERUST iron or steel parts in a hurry with D-Scale-RW. Put the parts in a tumbling barrel, add the descaling powder and water. It usually takes only 15 to 30 minutes to remove scale. Can be used with abrasive mediums. Safe to handle. No fumes. Dept. FM, Magnus Chemical Co., Inc., Garwood, N. J.

IT'S HARD TO GET CADMIUM for plating electronic parts. So Maas & Waldstein Co., 438 Riverside Ave., Newark 4, suggest you use copper instead. They make a protective coating called Water Dip No. 33 that makes copper plating practical by preventing finger printing, water staining, and oxidation. You can dip plated parts in it direct from the last hot water rinse. No drying needed.

LAMINATED METAL called Alcuplate has many applications in electrical field, says its maker. It consists of aluminum and electrolytic copper bonded together with nothing between to offer any resistance to heat or electricity. Suggested uses: terminating aluminum conductors; joining aluminum tube to copper tube; for clips, shims, bushings, etc. General Plate Div., Metals & Controls Corp., Attleboro, Mass.

MOLECULAR ATTRACTION enables a molybdenum-base lubricant called Liqui-Moly to attach itself to metal-bearing surfaces and form a tough lubricating film that can't be eliminated by any amount of pressure, says Lockrey Co., Lubricants Div., College Point, N. Y. Also withstands wide range of temperatures.

PROTECTIVE FILM made with water, manufactured by Tennessee Eastman Corp., 10 E. 40th St., New York 16, has many industrial uses. It's called SCS (sodium cellulose sulfate). When added to water, the solution thickens rapidly. Spread it over a smooth plate, evaporate the water, and you get a clear, strong, grease-proof, nonburning film. Maker claims many applications in textile, paper, paint, detergent, and food industries.

INCREASE COOLANT EFFICIENCY by adding Hydrodyne, says Aquadyne Corp., 220 E. 42nd St., New York 17. It's a multiphase wetting agent designed to assure close contact with working surfaces, thus speeding heat dissipation, giving longer tool life, and enabling faster machine speeds. Costs less than ½ cent per gallon of coolant, says the maker.

More on next page

Management and Labor BOTH agree that the High Cost of EYE ACCIDENTS Can be Cut—NOW!

Eye Accidents Cost $160,000,000 in LOST MAN HOURS*

In these days of accelerated production, what to do about other high costs may be debatable, but the wisdom of preventing eye accidents and their high costs is clearly apparent by simple arithmetic. A goggle representing an investment of about $2.30 can prevent a four figure claim . . . keep an experienced man on the job instead of a novice . . . protect the valuable machine he works on (as well as the man) . . . keep volume up and rejects down. Add the direct savings in medical care, first aid, and the indirect benefits of improved morale, and the case for an AO Eye Protection Program is overwhelming — particularly when the program can pay for itself in less than 6 months time! Ask your nearest AO Safety Representative for complete details.

*ESTIMATE. Does not include average cost of compensation which even for the low cost year of 1938 was $328.00.

American Optical

SAFETY PRODUCTS DIVISION

SOUTHBRIDGE, MASSACHUSETTS • BRANCHES IN PRINCIPAL CITIES

BELTING
BUILT FOR THE TOUGH JOBS!

HEWITT-ROBINS Conveyor Belting gives longer service at less cost

When trouble comes by the ton . . . whether it's heavy abrasives like ore and rock or wet, gritty materials like fines and slag . . . the easiest, most dependable and most economical way to move it is on a Hewitt-Robins conveyor belt.

For over half a century the Hewitt Rubber Division of Hewitt-Robins Inc., has pioneered in making the right belt for every conveyor installation. Today, engineers the world over instinctively specify Maltese Cross® where the going is really tough, Ajax® for general service, and Conservo® for lighter applications and portable conveyors.

In Hewitt Rubber belting they get full protection against moisture, oils, flexing and ply-separation, as well as treatment against mildew. They get abrasion-resistance from extra-tough rubber covers, heavily textile-reinforced for maximum strength plus flexibility.

* * *

Engineers turn to Hewitt-Robins not only for belting but for entire belt conveyor systems. They know Hewitt-Robins is *the only firm able to accept complete responsibility*. For belting, address Hewitt Rubber Division, Buffalo 5, N. Y.; for machinery, Robins Conveyors Division, Passaic, N. J.; for engineering services, Robins Engineers Division, 157 Chambers St., New York.

HEWITT-ROBINS

CONVEYOR BELTING

HEWITT-ROBINS HR **INCORPORATED**

BELT CONVEYORS (*belting and machinery*) • BELT AND BUCKET ELEVATORS
CAR SHAKEOUTS • DEWATERIZERS • FEEDERS • FOAM RUBBER PRODUCTS
FOUNDRY SHAKEOUTS • INDUSTRIAL HOSE • MINE CONVEYORS • MOLDED RUBBER GOODS
RUBBERLOKT ROTARY WIRE BRUSHES • SCREEN CLOTH • SKIP HOISTS • STACKERS
TRANSMISSION BELTING • VIBRATING CONVEYORS, FEEDERS AND SCREENS

NEW MATERIALS

Begins on page 248

GOOD MACHINABILITY and uniformity of strength in all directions are two features of a new Insurok phenolic laminate reinforced with unwoven cotton fibers. Called Grade T-815, it's primarily intended for gears, cams, textile bobbin heads, and similar mechanical applications. Has good electrical and moisture resistance properties. The Richardson Co., 2763 Lake St., Melrose Park, Ill.

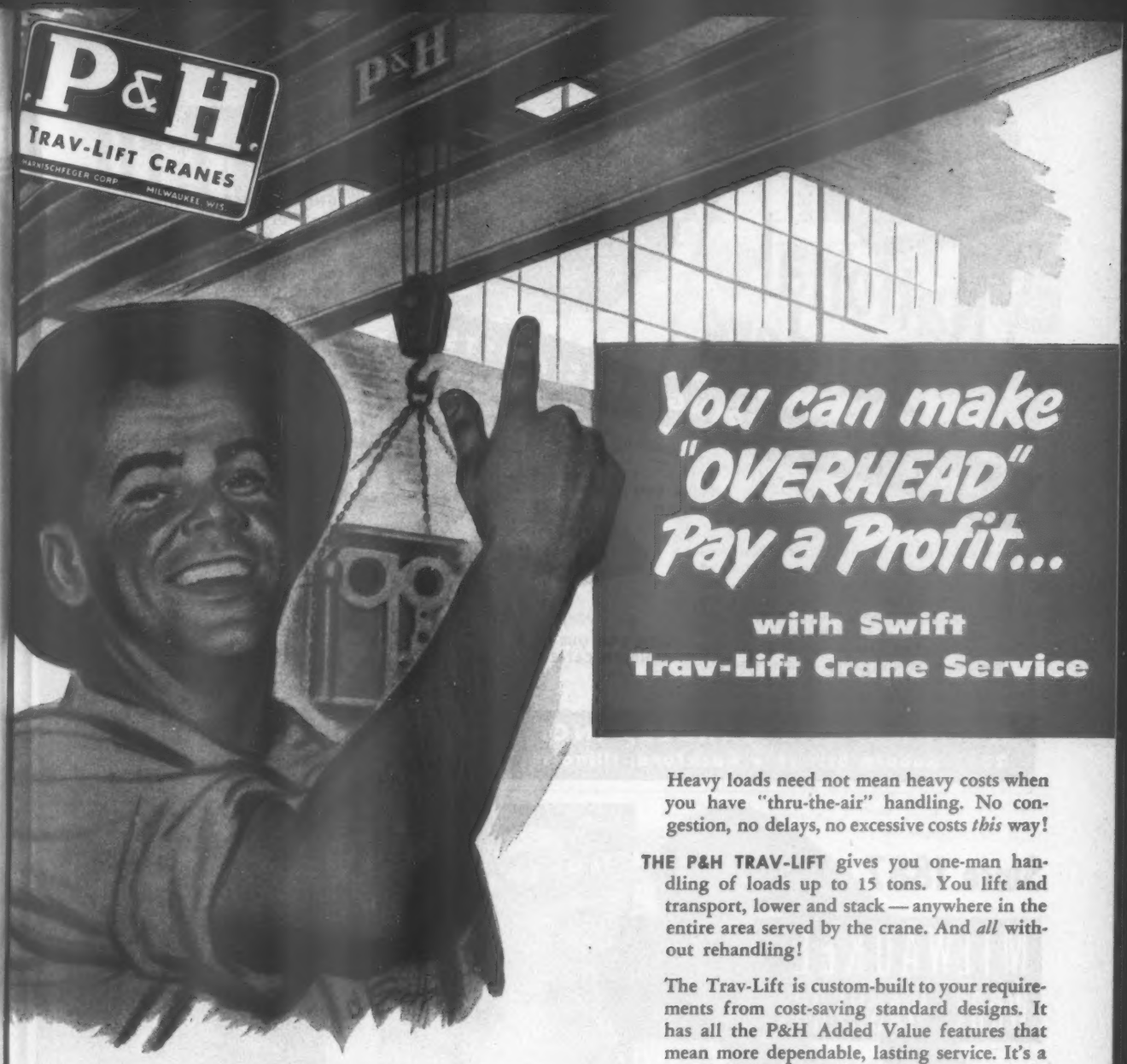
ANAEROBIC PERMAFIL is the technical monicker given to a new substance developed in the chemistry divisions of the General Electric Research Laboratory, Schenectady 5, N. Y. The substance remains liquid as long as a stream of air bubbles through it, but hardens in a few minutes when away from air. It will penetrate extremely small cracks before hardening, indicating applications in sealing pipe leaks or threaded unions. It is not yet on the market.

METAL PRESERVATIVE. Saf-pHilm, is especially designed to protect highly metal finished surfaces, parts, end equipment prior to storage or shipment. Forms a colored, yet transparent, film in 15 minutes. Resists acids, alkalis, and abrasion, but is removable with kerosene or solvent. Swan-Finch Oil Corp., 30 Rockefeller Plaza, New York 20.

CUTTING OIL ADDITIVE keeps soluble oils and coolants from getting rancid and smelly so fast. In actual cases, it has increased normal coolant life from two or three days to a period of three weeks. Effective solution uses only one gallon of additive to each 1200 gallons of cutting oil. For further details and trial demonstrations, write West Disinfecting Co., 42-16 West St., Long Island City 1, N. Y.

ALCONOX is a soapless cleanser for industrial laboratory equipment and degreaser for metal parts. Also good for cleaning linoleum, tile, woodwork, and anything made of porcelain or plastic, says its maker. Gets dirt out of irregular and inaccessible surfaces without tedious scrubbing. Won't irritate skin. Alconox, Inc., 61-63 Cornelison Ave., Jersey City, N. J.

PROTECTIVE COATING for both interiors and exteriors is made by Plastic Coating Corp., Suite 1841, 30 Rockefeller Plaza, New York. Appliable by spray gun. Dries in 5 to 10 minutes. Nonflammable. Cleans easily. Withstands chemical attack, temperatures to 160° F.



You can make "OVERHEAD" Pay a Profit...

with Swift Trav-Lift Crane Service

Heavy loads need not mean heavy costs when you have "thru-the-air" handling. No congestion, no delays, no excessive costs *this* way!

THE P&H TRAV-LIFT gives you one-man handling of loads up to 15 tons. You lift and transport, lower and stack — anywhere in the entire area served by the crane. And *all* without rehandling!

The Trav-Lift is custom-built to your requirements from cost-saving standard designs. It has all the P&H Added Value features that mean more dependable, lasting service. It's a product of P&H — America's leading builder of overhead handling equipment.

P&H Trav-Lift Cranes are built in capacities up to 15 tons

Get the Trav-Lift Story. It means new economy and efficiency in your handling if your service needs do not warrant investment in a heavy-duty crane.

These added values
protect your investment

VARIABLE SPEED FULL MAGNETIC CONTROL provides 5 distinct steps for all motions: controlled from pendant push-button or from operator's cab.

SAFE — Only 110 volts at the push-button when floor-controlled. Start-stop main line contactor, disconnect switch, thermal overload protection, magnetic limit switch and powerful brakes assure maximum safety.

ALL-WELDED BRIDGE AND TROLLEY incorporates the most important factors in reliable service — rigidity, safety, accessibility.

LIFE-TIME CONSTRUCTION — Motors designed specifically for crane service — high starting torque, frequent reversal. Shaved gears, grease sealed antifriction bearings throughout.

COMPETENT ENGINEERING SERVICE—P&H materials handling engineers will gladly give you their years of experience in working out your particular problems. Write us.

Handle it "THRU-THE-AIR" at LOWER Cost

P&H TRAV-LIFT CRANES

4525 West National Avenue
Milwaukee 14, Wisconsin

HARNISCHFEGER CORPORATION

...S • OVERHEAD CRANES • HOISTS • ARC WELDERS and ELECTRODES • SOIL STABILIZERS • CRAWLER and TRUCK CRANES • DIESEL ENGINES • CANE LOADERS • PRE-ASSEMBLED HOMES

MODEL 400
Mity-Midget

MODEL 300
Two-Pad

National Sanders

MADE BY SANDING SPECIALISTS

MODEL 500
Electric

Every facility of the new, modern National Sander plant is devoted to manufacturing sanders. Air driven or electric sanders with straight-line or orbital action are carefully made of strong, light-weight alloys. These sanders are not just part of a diversified line of power tools, but have been developed by men whose primary interest is in giving you the best possible finishing machines.

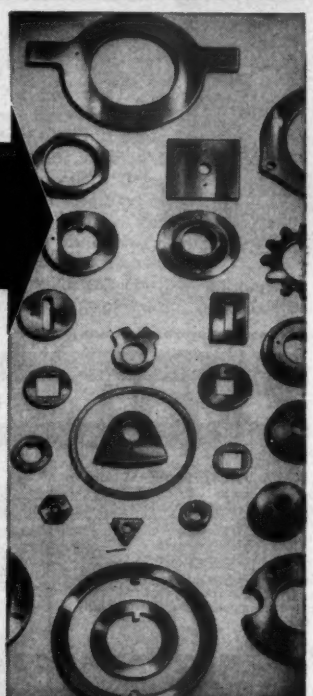
WRITE FOR OUR NEW SANDING CATALOG

NATIONAL NS SANDERS

NATIONAL AIR SANDER, INC.
2811 Auburn Street • Rockford, Illinois

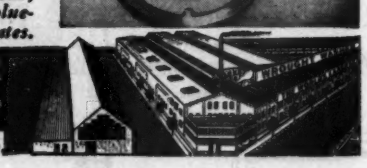
Since 1887

MILWAUKEE WROT WASHERS



Better WASHERS ... Competitively Priced

Large volume production, the most advanced methods and facilities, plus more than 60 years of continuous experience in the manufacture of Washers, are factors that enable us to offer you top quality washers and stampings at competitive costs. Over 22,000 sets of dies for making Washers of every type (Standard and Special), from every type of material, for every purpose, in any finish. STAMPINGS of all descriptions; Blanking, Forming, Drawing. *Submit your blueprints and quantity requirements for estimates.*



WROUGHT WASHER MANUFACTURING CO.
The World's Largest Producer of Washers
2259 S. BAY ST., MILWAUKEE 7, WIS.

IDEAS OF THE MONTH

Begins on page 92

UNPAINTABLE because it gets too hot? Try the new extra-high heat-resistant aluminum paint offered by Speco, Inc., Cleveland. It can take temperatures up to 1700 F. How about using it on your heat lines, compressors, condensers, ovens, radiators, etc., etc.?

FACTS AND FIGURES on microfilming engineering drawings have been prepared in a booklet you can get from Micro-Photo Service Bureau, 4614 Prospect Avenue, Cleveland 3.

OPTICAL TOOLING, developed by Republic Aviation Corp., Farmingdale, N. Y., pays off in decreased man-hours, lower costs, improved accuracy. It's a way to line up the fixture fittings of a jig visually with precision optical equipment.

NYLON CAPS AND GOWNS help keep precision machine shop at North American Aviation's Downey, Calif., plant free of dust particles. Gyro mechanisms for guided missiles are assembled on mirror-like surfaces of black-topped tables which show up dust particles.

VINYLFILM COVER (Industrial Covers Co., Akron) was designed for auto mechanics. They use it to protect car finishes and upholstery. But you can use it, too. Prices: $2 for the 36" x 54" size; $2.35 for the 36" x 66" cover.

HEAT TREAT REVIEW is to be published periodically by Surface Combustion Corp., Toledo 1. Free to industrial metallurgist and heat treaters.

DIAMOND ROLLER CHAINS

ASSURE MAXIMUM MACHINERY OUTPUT

100% POWER AT SOURCE

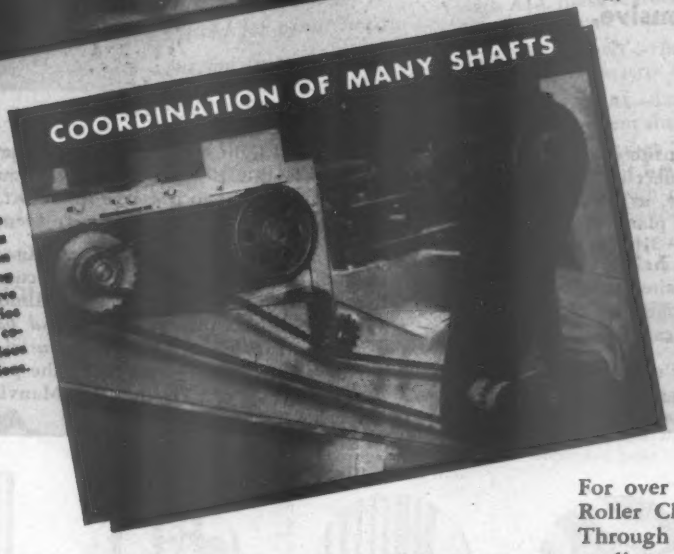
98-99% AT POINT OF USE

There is no slip—no power waste in driving bread mill at 2500 r.p.m. with triple ½-in. pitch Diamond Roller Chain from 1800 r.p.m. motor.

100% SPEED RATIO

Exact speed of driving is required for this wire mill application. Six-strand positive Diamond Roller Chain from 40 h.p. electric motor.

COORDINATION OF MANY SHAFTS



Many shafts can be operated from a single source on short or long centers and positive 100% speed ratios insured to coordinate various machinery functions.

OUTPUT MAINTAINED ECONOMICALLY

- Long-life performance
- Great reserve strength
- Adaptability
- Ease of maintenance
- High efficiency 98–99%

For over 60 years, the use of Diamond Roller Chains has continually widened. Through proof of performance, improved quality and reliability, Diamond has become the preferred Roller Chain.

DIAMOND CHAIN COMPANY, Inc.
Dept. 449, 402 Kentucky Ave., Indianapolis 7, Ind.

Offices and Distributors in All Principal Cities

Refer to the classified section of your local telephone directory under the heading CHAINS or CHAINS-ROLLER

DIAMOND ROLLER CHAINS

CORRUGATED TRANSITE* ... *alone or in combination with other materials*

*Transite is a registered Johns-Manville trademark

You can build the entire exterior with these streamlined sheets...

or use them equally well with other materials to develop attractive contrasts.

Transite sheets can't burn, rot, or rust—and they're not expensive.

WHEN Corrugated Transite is used by itself for exterior walls, the effect is often one of massive, streamlined simplicity, as you can see by the appearance of the gigantic plant, upper left.

Combined with stone, brick, or glass, Johns-Manville Corrugated Transite helps create striking architectural contrasts, as in the United Airlines Maintenance Base in San Francisco.

Applied either vertically or horizontally, the corrugations in the Transite sheets cast the pleasing shadow lines so desirable to architectural design.

The natural light gray color of Transite is attractive without further decoration, and the material itself never needs paint to preserve it. In fact, Corrugated Transite is *rotproof, weatherproof, fireproof.*

The large sheets permit rapid application, a minimum of framing, lower construction cost. When need for alteration arises, the sheets are almost 100% salvageable. If you plan to build—*and particularly if you have a problem of rapid industrial expansion for military defense*—investigate the possibilities of Corrugated Transite. Write Johns-Manville, Box 158, Dept. FM, New York 16, N. Y.

EASY TO FASTEN TO STEEL

EASY TO SAW

EASY TO DRILL

EASY TO NAIL TO WOOD

Johns-Manville *Asbestos* **CORRUGATED TRANSITE**

DIRECT-TO-YOU SHIPMENTS OF BRONZE BAR STOCK CUT BEARING COSTS!

Stocks of N-B-M "Tiger" Bronze now located for fast delivery of the bar size you want, when you want it.

National Bearing Division has announced a new direct-shipment policy on "Tiger" Bronze Bar Stock—a policy designed to substantially reduce costs of bearings, *used for plant maintenance or on production lines.*

Stocks have been conveniently "spotted" to assure fast delivery. All popular sizes in 13" lengths are available—as-cast or machined cored and solids, or as-cast hexagons.

Product Designers and Plant Engineers with an eye on bearing costs are urged to get the complete facts.

Inquiries receive prompt attention.

"TIGER" BRONZE . . . the ONE Bronze Alloy with ALL these features for longer bearing service at lower cost . . .

WEAR-RESISTANT—Has correct balance between bronze matrix and lead. *Lasts longer.*

ANTI-FRICTIONAL—Low coefficient of friction helps prevent shaft seizure. *Saves power.*

SHOCK-RESISTANT, EMBEDDABLE—Hard enough to stand up under heavy bearing loads. Soft enough to embed foreign material. *Protects the shaft.*

EASY TO MACHINE—With speeds as high as 3000 F.P.M. *Saves time.*

USE THIS COUPON—*for price quotations by return mail, and new bulletin giving complete FACTS on physical properties, operating characteristics, bar types and sizes.*

Please send me your new Cored and Solid Bar Bulletin and prices on "Tiger" Bronze:

Name..... Title .....

Company .....

Address. .....

City..... State .....

We use Bronze Stock for .....

Approximate poundage used per month: .....

NBM

AMERICAN **Brake Shoe** COMPANY

NATIONAL BEARING DIVISION

4928 Manchester Avenue • St. Louis 10, Mo.

PLANTS IN: ST. LOUIS, MO. • MEADVILLE, PA. • NILES, OHIO • PORTSMOUTH, VA. • ST. PAUL, MINN. • CHICAGO, ILL.

For specialty wires—a specialty mill

Wires as fine as .003" made to meet your exacting specifications by Johnson specialists, quality producers of:

MUSIC SPRING WIRE.
AIRCRAFT CABLE WIRE.
BRUSH WIRE FOR HAND AND POWER BRUSHES.
HOSE REINFORCEMENT WIRE (BRAIDED TYPE).
VACUUM HOSE WIRE.
FLAT AND HALF OVAL SPECIAL SPRING WIRE.
OIL TEMPERED SPRING WIRE.
HARD DRAWN SPRING WIRE.
HIGH CARBON ROPE WIRE.
HIGH TENSILE GALVANIZED STEEL WIRE.

Bright drawn, tinned, galvanized, liquor finish, copper coated, bronze plated, alloy coated.

Johnson sets the standard of the industry

JOHNSON

STEEL AND WIRE COMPANY, INC.
WORCESTER 1, MASS.

New York Philadelphia Cleveland Detroit Akron Chicago
Atlanta Houston Tulsa Los Angeles Toronto

BOOKS...

For copies of books and booklets reviewed, write directly to publisher listed.

. . . How to Determine What's "a Fair Day's Pay"

The AMA Handbook of Wage and Salary Administration

Edited by **M. J. DOOHER** and **VIVIENNE MARQUIS.** American Management Assn., 330 W. 42nd St., New York 18. Tables, graphs, charts, sample forms, appendix, bibliography, index. 416 pp. $7.50.

FACTORY's industrial relations editor, M. J. Murphy, felt that this book was important enough to merit special attention in this month's *Books & Booklets* column. After reading his comments below, we think you'll see why.

"The problems of wage and salary administration are hard to solve even under normal conditions. With federal wage stabilization rules now in the picture, plant operating executives are going to need all the help they can get to cope with the new complications that are sure to come.

"The American Management Association offers some of the needed help in this handbook. Through its monthly magazine, *Personnel*, and its many conference reports, AMA has presented several hundred articles over the past several years that have reflected sound wage administration thinking and practice. The best of these are brought together here.

"The coverage is well balanced. Unlike most current texts on the subject, the different methods of evaluating jobs are all treated in detail. Despite this, the book is not overloaded with material on job evaluation methods. Other important topics are given plenty of attention, such as: wage surveys, compensation for salaried and managerial jobs, maintaining the program, and coping with day-to-day operating problems. In general, the treatment is practical and useful.

"The list of contributing authors is impressive. They are experienced, competent men, whose names are well known in the field. Editors M. Joseph Dooher and Vivienne Marquis have made reference easy by organizing the material into ten major divisions."

More on next page

Guard Against Atmospheric Hazards...

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Century Electric Company is celebrating its 50th year in the electrical industry.

Drip Proof

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Capacitor—1/6 to 20 H.P.
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DIRECT CURRENT MOTORS

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AC, .63 to 250 KVA
DC, .75 to 200 KW

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1/8 to 1-1/2 H.P.

MOTOR GENERATOR SETS

AC to DC, AC to AC
DC to DC, DC to AC

Open Protected, Splash Proof, Totally Enclosed Fan Cooled, Explosion Proof.

Ball Bearing motors are factory lubricated for several years' normal service. Bearing housing construction permits easy re-lubrication when unusual service demands it.

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To guard your production against the destructive effects of atmospheric hazards, Century offers four types of protective motor frames.

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BOOKS...

Begins on page 256

. . . For Industrial Relations and Personnel Executives

Industry's Unfinished Business

SARA E. SOUTHALL. Harper & Bros., 49 E. 33rd St., New York 16. Foreword by Fowler McCormick, chairman of the board, International Harvester Co. References, index. 173 pp. $2.50.

By "unfinished business," the author means the setting up of fair employment practices plans in industry. She explains the importance of good industrial relations, goes on to discuss one particular phase: the employment of minority groups. She illustrates her beliefs by telling how International Harvester and other companies have tackled the problem.

. . . For Methods and Time Study Executives

Motion and Time Study

M. E. MUNDEL, professor and chairman, industrial engineering, Purdue Univ. Prentice-Hall, Inc., 70 5th Ave., New York 11. Drawings, formulas, graphs, sample forms, photos, bibliography, index. 457 pp. $6.65.

What can motion and time study do for you? How and where do you apply it? You'll find the answers in this scientifically correct yet practical book. Covers the subject from A to Z. Includes dozens of case examples.

. . . For Maintenance and Production Executives

Direct Current Motor Manual

H. S. DUSENBURY. The Macmillan Co., 60 5th Ave., New York 11. Photos, drawings, formulas, tables, circuit diagrams, graphs, glossary of terms, index. 275 pp. $3.50.

From basic construction to electronic and other controls to trouble-shooting and maintenance, this book tells all that the direct current motor user needs to know. Application data are included, as well as National Electric Code rules and requirements. An appendix presents useful formulas, definitions, and other technical information.

More on next page

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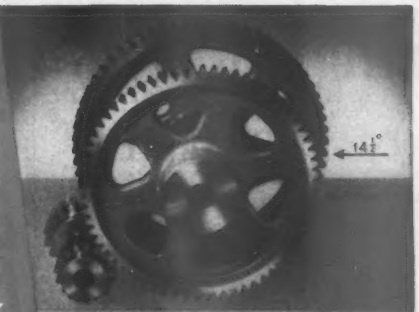

The Boston Spur Gears cut 20° Pressure Angle in the foreground do the same job as the 14½° Angle Gears in back. A 20% saving in space — 20% saving in cost.

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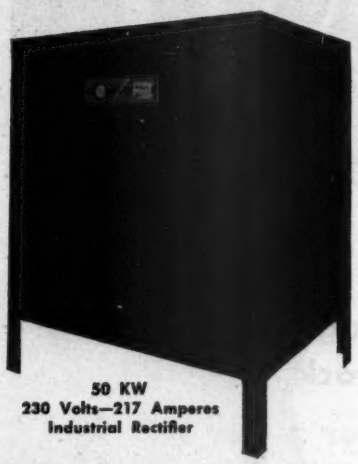

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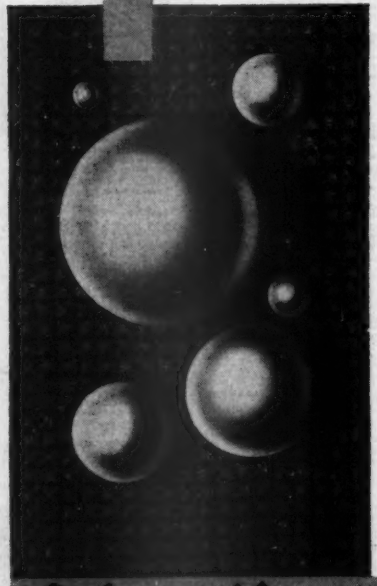

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Strom has been making precision metal balls for over 25 years for all industry and can be a big help to you in selecting the right ball for any of your requirements. In size and spherical accuracy, perfection of surface, uniformity, and dependable physical quality, there's not a better ball made.

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BOOKS...

Begins on page 256

. . . For Top Management and Personnel Executives

The Aged and Society

Industrial Relations Research Assn., 704 S. 6th St., Champaign, Ill. Graphs, tables, charts, references. 237 pp. $3.

Faced by a short labor supply, unions and management are showing more and more interest in older workers. And even without the influence of that shortage, our population, both in industrial and rural societies, is aging. In this book, 16 men—from the fields of industry, labor, government, and education—discuss the problems that result from this situation. Their writings will help you to understand your older workers and to utilize their talents to the best advantage.

. . . 945 Pages of Answers to Your Packaging Problems

1951 Modern Packaging Encyclopedia

Breskin Publications, 122 E. 42nd St., New York 17. Photos, tables, diagrams, drawings, advertisements, sample papers, buyers' directory, four indexes. 945 pp. $3.

Case studies of 14 companies that do top-flight packaging jobs highlight this 22nd edition of Breskin's packaging workbook. Other sections are packed with the latest information on all known packaging materials, techniques, and machinery. Also tells how to integrate packaging operations with the related manufacturing activities. Divided into ten sections for easy reference.

. . . For Quality Control Engineers

Technological Applications of Statistics

L. H. C. TIPPETT. John Wiley & Sons, Inc., 440 4th Ave., New York 16. Formulas, tables, charts, graphs, bibliography, index. 189 pp. $3.50.

The author, an outstanding British statistician, has prepared this book from a series of lectures he gave at M.I.T. In Part I, he explains the function and use of the statistical control

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Tough service?... You bet!

0 to 800 rpm in 8/10 Second . . . 26 Times per Minute. And this De Laval speed reducer takes it and likes it. This particular unit is driving a conveyor belt that automatically feeds and measures billets going into a shear. If you are rough on reducers in your plant, tell your problems to one of our power transmission engineers.

What do you want to pump?

Molasses, Glue, Lard, Soya Oil, Film Dope, Corn Syrup, Vegetable Oil, Paste, Fuel Oil, Shortening, Resin, Varnish, Linseed Oil, Viscose Rayon, Liquid Latex . . .

We frankly don't know all the other products that an IMO can pump, but if you want a better way to transfer fluids like these from one place to another, chances are an IMO can do the job for you. The IMO is a screw-type rotary pump. Its axial flow design permits liquids to be pumped close to the axis of the rotor. This means low liquid velocity through the pump and quiet pulsation-free flow. Capacities range to 1000 gpm at 500 psi and 150 gpm at 1500 psi.

There's a new idea here!

We've simplified the already simple centrifugal pump! Our new GS pump is designed so that every working part . . . every part subject to wear, is contained in one easily replaced unit rotor assembly. Through our Service and Exchange Plan new rotor assemblies are available for immediate shipment from conveniently located stocks throughout the country.

This means good service, and if maintenance ever does become necessary, all you have to do is remove the cover and end plate bolts, lift out the old rotor and drop a new one in place. *It's that easy!* Capacities to 400 gpm — heads to 230 feet.

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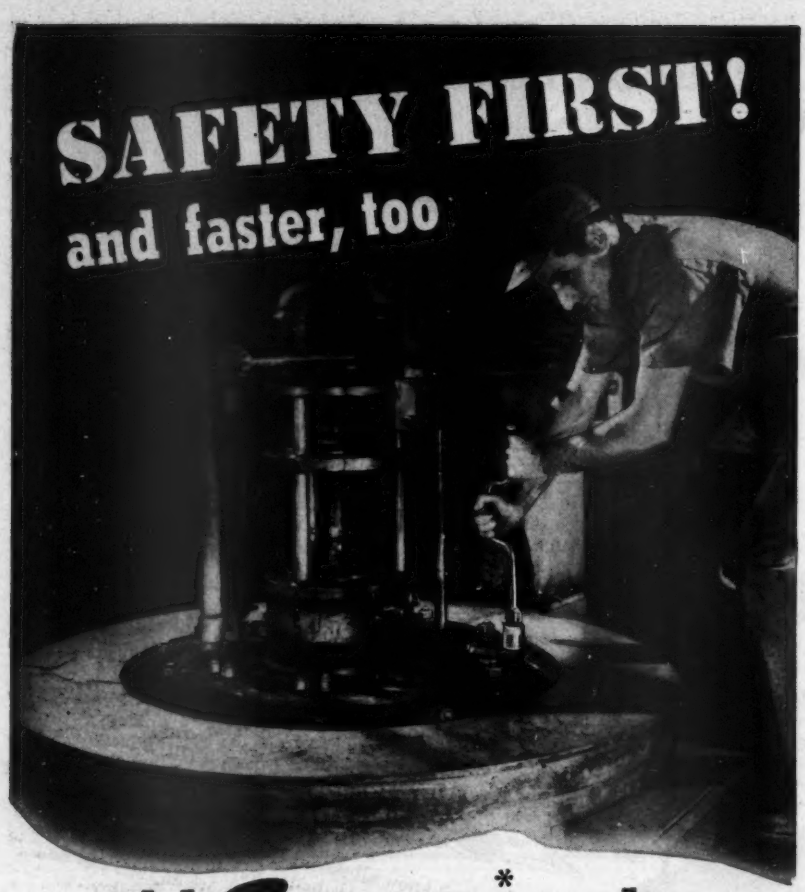

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that fit the job!

● A tricky job repeated every batch! Turning down or backing off the cover-bolt nuts on this heat-treating and carburizing furnace is a mean, hot routine. Can't blame a man for wanting to hurry it up. But one slip of the wrench could mean a serious burn. That's where snug-fitting, "job-engineered" Snap-on Wrenches pay off. They give a man confidence. They take hold and they *hold on*. They've got the strength, the toughness to stand up under heavy leverage and husky muscle-power hastily applied. Yes, Snap-on Tools help men turn in a better day's work—for themselves and for the plant or shop. That's why they're top choice everywhere for production, assembly and maintenance operations.

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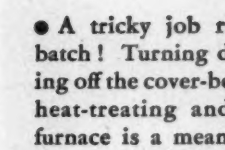

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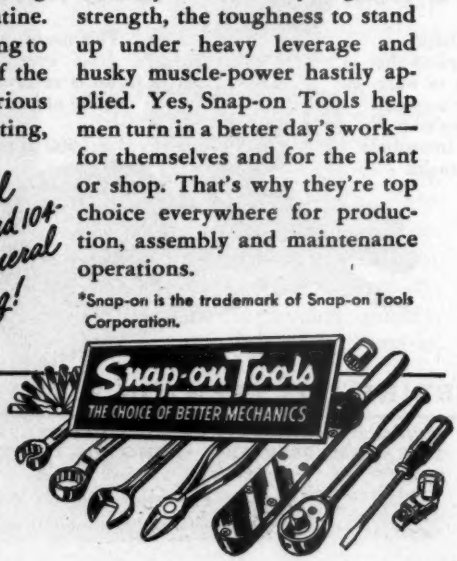


BOOKS...

Begins on page 256

chart. Part II is devoted to an explanation of the theories of errors and variations and a discussion of their technological application.

. . . GM Describes Experiment in Employee Relations

My Job Contest

C. E. EVANS and L. N. LASEAU, Employee Research Section, General Motors Corp. Personnel Psychology, Inc., 1727 Harvard St., N.W., Washington 9, D.C. Photos, samples of contest posters and literature, charts, tables. 306 pp. Paper bound, $2.50. Cloth bound, $3.50.

Back in 1947, an idea for a letter-writing contest turned up at a General Motors staff conference. The contest—letters on "My Job and Why I Like It"—was expected to reveal certain basic employee attitudes. More important, it was considered a first step in a long-range, two-way communications program.

In "My Job Contest," two men who helped develop, promote, and run the contest tell how they did it. They describe the results obtained, how these results have been translated into action, and what these results imply for the future.

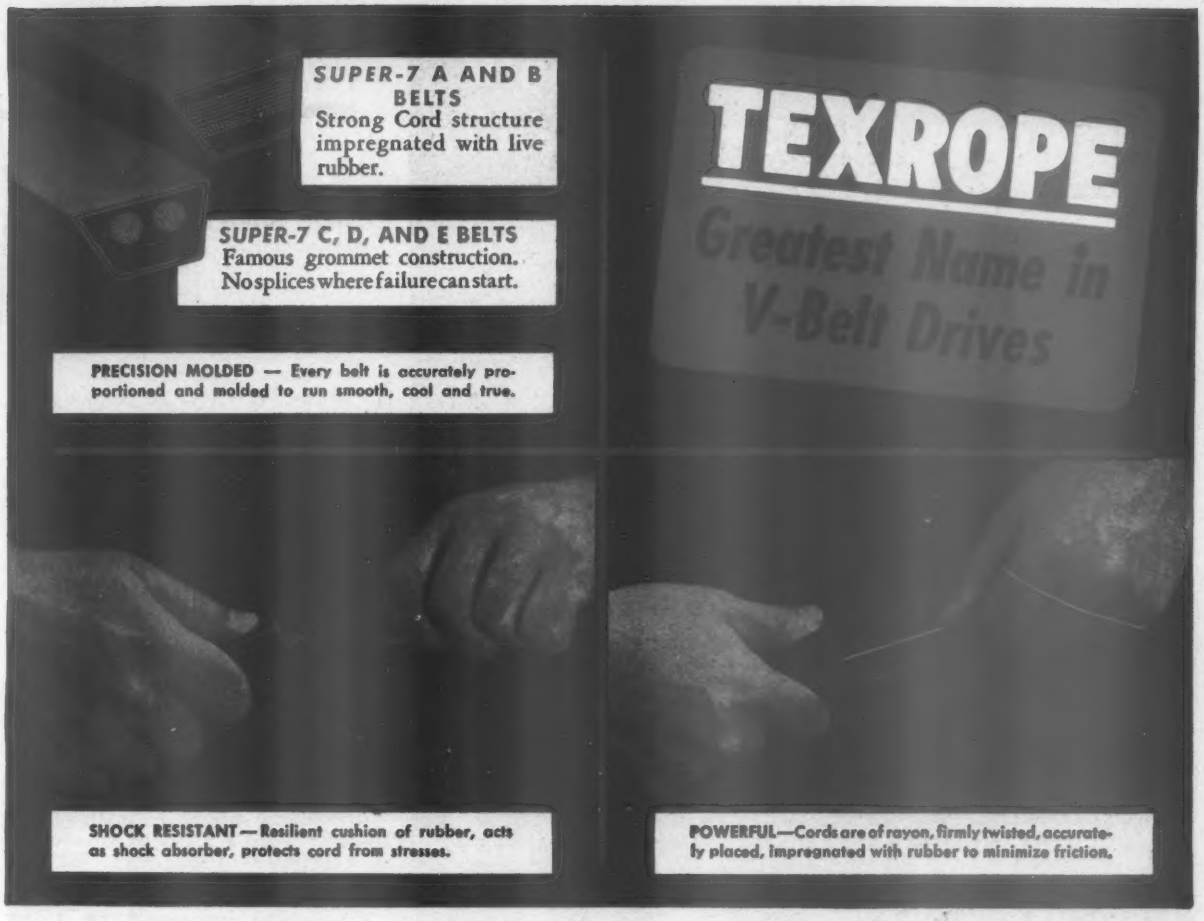
. . . Statistics Can Be Useful to Every Management Man

Effective Management Through Probability Control

R. K. MUELLER, Asst. General Manager, Plastics Div., Monsanto Chemical Co. Funk & Wagnalls Co., 153 E. 24th St., New York 10. Charts, photos, drawings, references, index. 310 pp. $5.

The growing popularity of statistical quality control has caused many management people to overlook the usefulness of statistics in other phases of their day-to-day jobs. In this book, the author tells how foremen and president alike can save time and improve their own performance by learning and applying simple statistical concepts. He includes 44 case studies that show how statistical controls have led to increased profits.

More on next page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Famous grommet construction. No splices where failure can start.
PRECISION MOLDED — Every belt is accurately proportioned and molded to run smooth, cool and true.
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SUPER-7 V-belts give long, satisfactory service even under bad conditions of load, shock and grit.

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But you get more than good belts when you standardize on *Super-7* V-belts. You also get the benefit of the greatest V-belt experience in the world both in the field and factory. You are assured of exactly the right drive for longest life from the wide variety of types and sizes available.

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Where space is limited or other special conditions demand heavier duty, the high capacity belt can be furnished in A, B, C, D, and E sections . . . Extra strong cords, special rubber cushion and tough Neoprene cover give them 40% greater capacity than standard belts at proportionately higher price.

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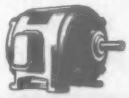

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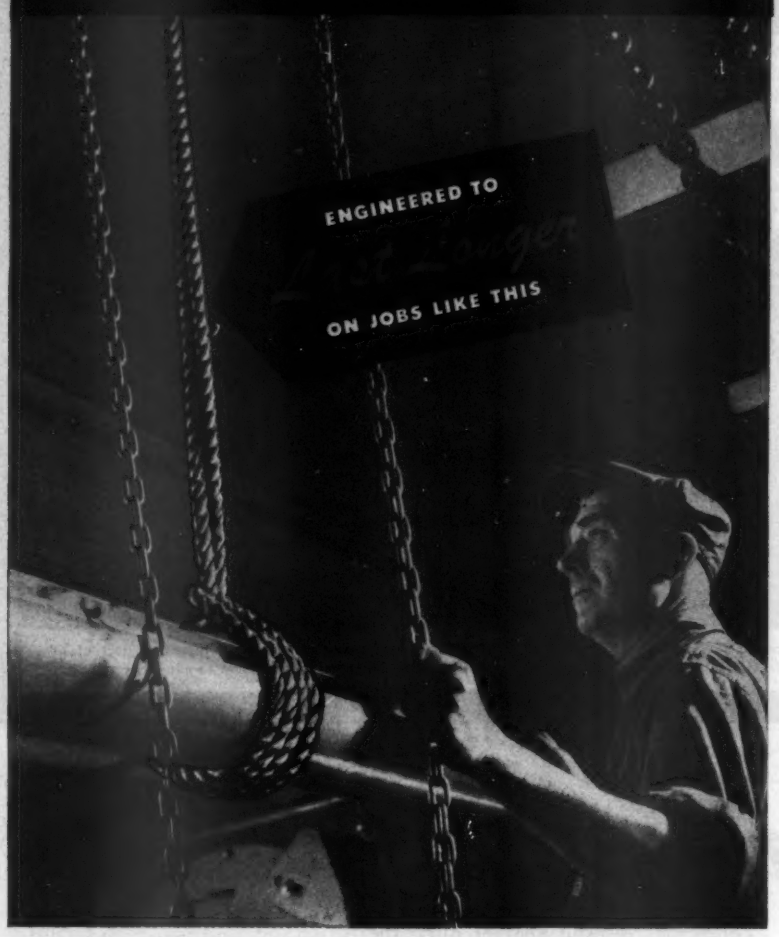
For Highest Rope Strength

PLYMOUTH SHIP BRAND MANILA



THE HIGHER your rope's tensile strength, the safer your workmen and the things they handle. The true tensile strength of Plymouth SHIP BRAND Manila rope is as much as 25% more than shown in published "minimums". It's your best long-term insurance against accidents, especially when ropes are suddenly strained beyond their normal safety factor. Play safe next time and specify Plymouth SHIP BRAND Manila—your best rope buy at *any* price. Return coupon for helpful data.

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Send informative booklets and charts to help get more life from my ropes.
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ROPE AND TYING TWINE FOR INDUSTRY

BOOKLETS

Begins on page 262

PERSONNEL PROBLEMS UNDER MOBILIZATION. American Management Assn., 330 W. 42nd St., New York 18. Personnel Series No. 135. Four papers and a panel session. Covers security and loyalty, selective service requirements, recruiting and utilizing manpower, economic education, and others. 62 pp. Members, $1. Nonmembers, $1.25.

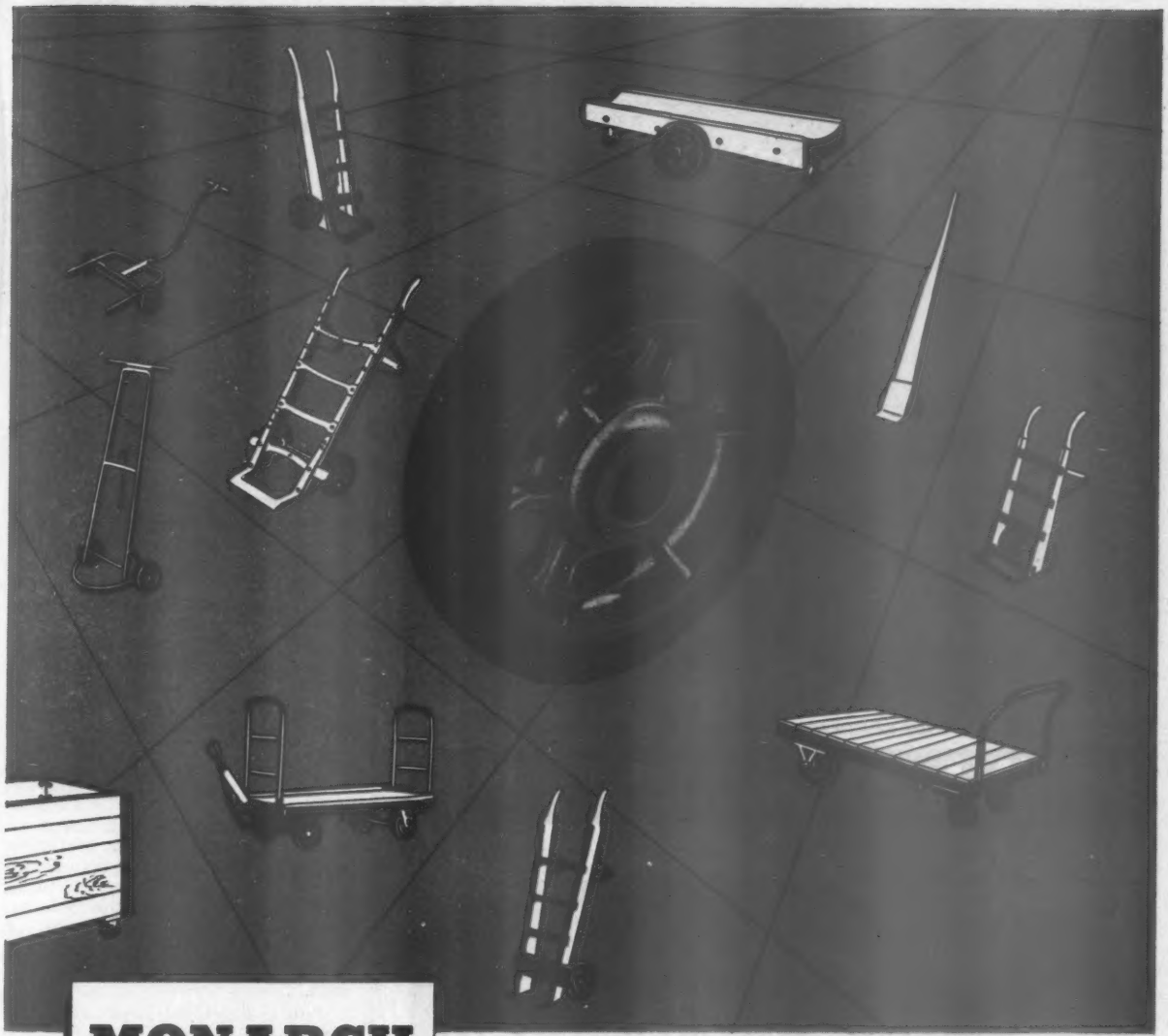
STRATEGIC ECONOMIC FACTORS OF THE 1950's. American Management Assn., 330 W. 42nd St., New York 18. General Management Series No. 149. A panel session designed to give executives sound economic guideposts for the years ahead. Plus three other papers—one called "After 1952—What?" 36 pp. 75c.

OPERATING UNDER NON-OCCUPATIONAL DISABILITY LAWS. American Management Assn., 330 W. 42nd St., New York 18. Insurance Series No. 87. A panel session tells how you can best answer the problems arising with these new laws. With a paper on government regulation of insurance. 50c.

CONTROLS AND COVERAGES AGAINST DISHONESTY LOSS. American Management Assn., 330 W. 42nd St., New York 18. Insurance Series No. 85. A case study shows how one dishonest employee in a large company got away with almost a million dollars before being caught. Another paper and a panel session tell how insurance companies can help keep this from happening to *your* firm. 32 pp. 50c.

APPRENTICESHIP PAYS DIVIDENDS. Bureau of Apprenticeship, U. S. Department of Labor, Washington 25, D. C. Outlines ten ways in which present-day apprenticeship nets worthwhile returns. Lists regional offices, state apprenticeship agencies, references. 15 pp. Free.

PRODUCTION MANAGEMENT SURVEY. R. M. Barnes and J. B. Sullivan. Bureau of Business & Economic Research, Univ. of Calif., Los Angeles. Compares industrial engineering practices of 67 firms in Los Angeles area with those of 89 others in the east and midwest. Also covers clauses in union contracts pertaining to time study, production standards, wage incentives. Tables, charts, contract clauses, copy of questionnaire. 21 pp. Size, 8½x11. Free.



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Soft Touch for Floors

Easy-going Monarch Tires on your hand trucks will make your floors last longer, reduce your floor repair bills—Monarch Tires never groove or chip floors. Monarch-equipped caster wheels are instantly responsive to changes in direction. Make sure the hand trucks you buy are equipped with Monarch Tires. Available in oil-resistant synthetics.

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SPECIALISTS IN INDUSTRIAL SOLID TIRES AND MOLDED MECHANICAL RUBBER GOODS

In the stepped-up pace of war production, it is vitally important to provide adequate recreational facilities for your personnel. For this reason, more and more industrial plants are wisely installing American Shuffleboards as a part of their employee welfare program.

The popular 9'x33" Buccaneer model American Shuffleboard, as illustrated, is compact, sturdy and durable. Provides a variety of 8 different and exciting games, all adaptable to team and league competition.

When not in use, the Buccaneer may be quickly folded (illustrated) & stored in a 3' x 9' x 9" space!

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OTHER MODELS ALSO AVAILABLE AT $179.00 UP

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MAGNOLIA
Die-Cast
Bearing
Bronze
LEAD-BASE FOR SHOCK-LOADS
Recent controls over tin-base alloys make it to your advantage to consider Defender Bearing Metal as a substitute for tin-base babbitt. Defender provides equal, and often superior performance in place of tin-bearing alloys in automotive connecting rods, gyratory rock-crushers, compressors, tipple cam straps, and the like. Write for our specific recommendation for your applications, or see your nearest Magnolia distributor.
SOLD THROUGH INDUSTRIAL DISTRIBUTORS
MAGNOLIA METAL COMPANY
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INDUSTRIAL FILMS

You Can Beat the A-Bomb stresses the preventative measures that can save lives. Designed to show the necessity of acquiring the techniques of self-protection. Specific instructions on what to do and how to do it. 16mm. sound film, runs 20 min.

Text-Film Dept., McGraw-Hill Book Co., 330 W. 42nd St., New York 18.

A new process for welding aluminum, stainless steel, bronzes, and monel is pictured in **The Tool for the Job.** Through the use of special filters, actual deposition of weld metal and details of the arc can be seen. Animation and demonstration help you over the technical explanations. 16mm., Kodachrome, sound film. 21 min.

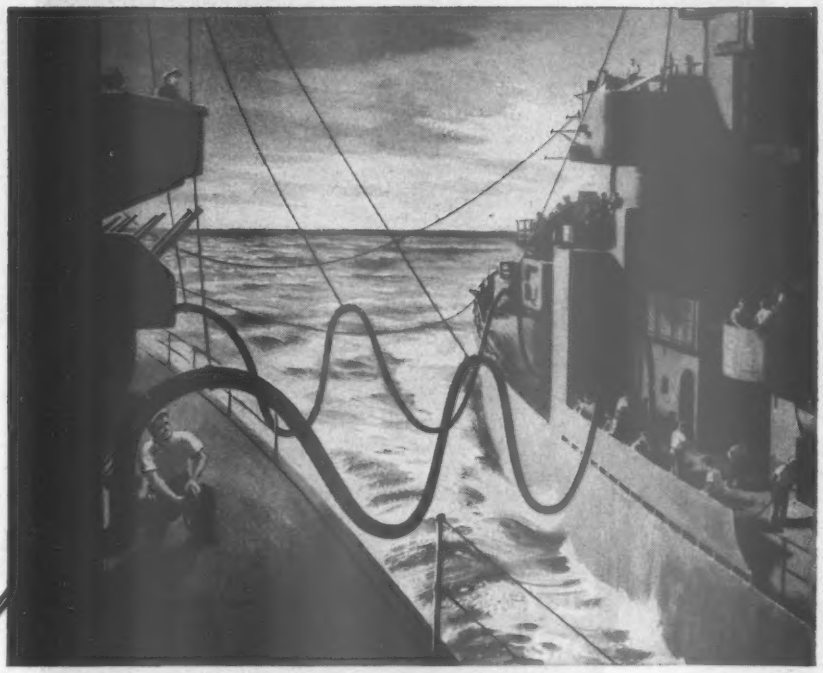
Air Reduction, 60 E. 42nd St., New York 17.

The Shortest Way tells the story of the die casting process. Materials and machines used, and actual production scenes are shown to illustrate the speed of the process. There's a complete discussion of the kinds of products that are "naturals" for die casting. 16mm., 27 min.

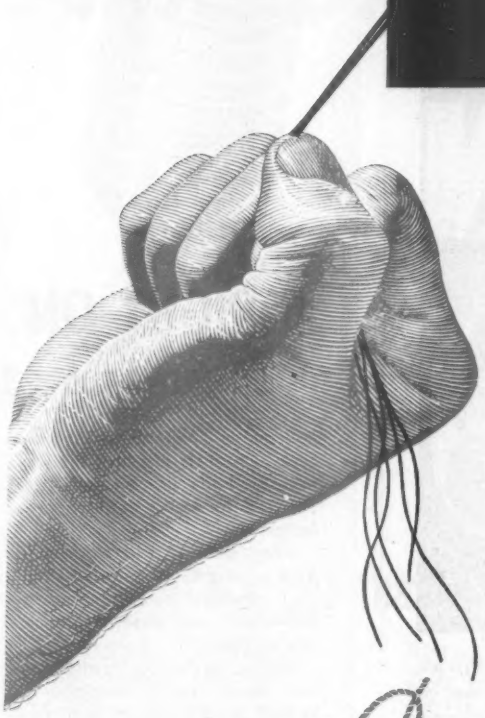
Public Relations Dept., Doehler-Jarvis, 386 4th Ave., New York.

There's a new series of six training films to teach supervisors and foremen how to address and conduct meetings. The first, **The Power of Speech,** discusses the purpose of a speech and different kinds of speeches. **Butterflies in Your Stomach** explains stage fright and how it can be overcome. **The Key to Good Speaking** outlines four methods of preparing a speech and gives the recommended method. **On Your Feet** explains what to do physically when making a talk. **Now You're Talking** covers vocabulary, phrasing of ideas, and attitude. **Ring the Bell** shows how to break the ice, how to get and hold the attention of an audience, and explains the value of visual aids. 35mm. soundslide with records. 13 min. each.

National Safety Council, 425 N. Michigan Ave., Chicago 11.



Feeding a ship at sea calls for an oil hose that's super-strong, yet flexible enough to take sharp bends without rupturing, light enough to be quickly passed from ship to ship. Cords of "Cordura" help make these hoses better because they provide full strength with fewer plies.



This Du Pont yarn increases strength without increasing cost

Smaller gauge cords of Du Pont Cordura* High Tenacity Rayon do the work of larger cords of natural fibers. Therefore, you can often reduce the bulk of a strength section when you use "Cordura"... and make a lighter, more flexible carcass . . . a better, less expensive product.

Yarns of "Cordura" are inherently stronger than yarns of natural fibers—they are made of continuous filaments with no short lengths to pull apart under strain. This means there are no weak spots in "Cordura" yarn. It's also scientifically uniform in gauge.

These properties of "Cordura" make tires safer and cooler-running, make conveyor belts thinner yet stronger, make garden hose so strong that one manufacturer now offers it with a ten-year guarantee.

If you use yarns, cords or fabrics in your business, there's a good chance the extra strength and low cost of "Cordura" can help you improve your method or your product.

*REG. U. S. PAT. OFF.

Du Pont "Cordura" High Tenacity Rayon

STRENGTH AT LOW COST

for RAYON . . . for NYLON . . . for FIBERS to come . . . look to DU PONT

WRITE NOW FOR THE FREE BOOKLET "Sinews for Industry." It gives physical properties of "Cordura"... tells you how Du Pont will help you benefit from the advantages of "Cordura" Rayon. Address: Rayon Division, Room 4421, E. I. du Pont de Nemours & Co. (Inc.), Wilmington 98, Delaware.

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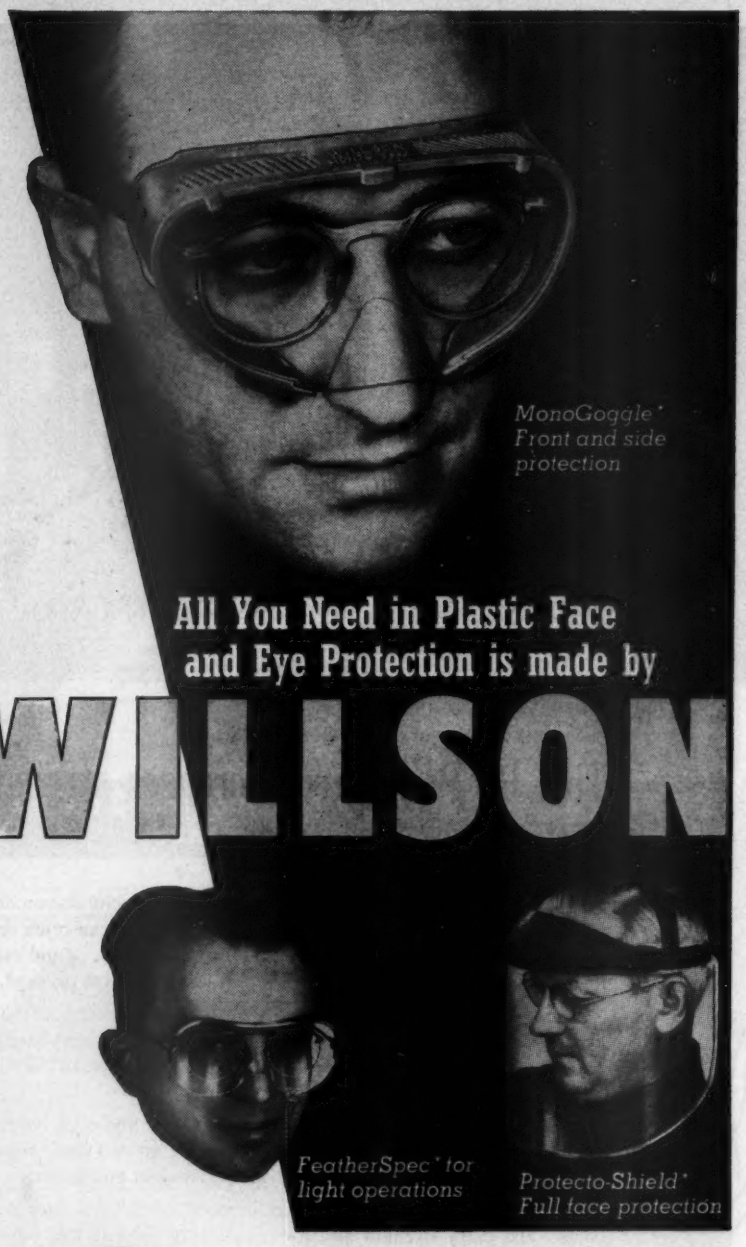

All You Need in Plastic Face and Eye Protection is made by

WILLSON

WILLSON*

Dependable Products Since 1870

These three types of protective devices, all with one-piece plastic lenses or visors and each with many variations, give you a wide selection to meet specific requirements of work hazards. Their light weight and comfortable fit insure workers' willingness to wear them for long hours on the job. Complete information on plastic protection and other eye and respiratory safety equipment is available in the new WILLSON catalog. Get your copy from our nearest distributor or write direct to WILLSON PRODUCTS, INC., 218 Washington Street, Reading, Pa.

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B-RIGHT-ON

SOCKET SCREW PRODUCTS

Brighton Nu-Process Socket Screw Products are produced by new methods just recently developed to make better screws faster.

Alloy steel is cold worked to form a continuous compact structure, resulting in better screws. In addition much closer tolerances are maintained.

Better service to dealer and user results from the exceptionally high productivity of Brighton's processes.

Ask for Brighton Socket Screws from your industrial distributor—be sure of getting products of peak quality.

Our new catalog gives the facts. Write for your copy.

BRIGHTON
Screw & Mfg. Co.
Reading Road opp. Deer Creek
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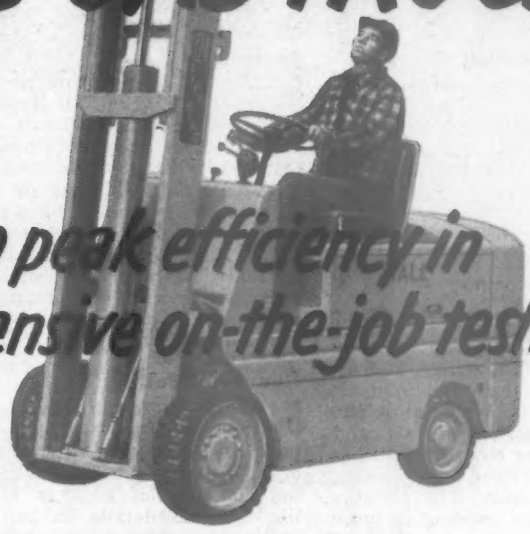
NOW READY FOR YOU —

New YALE Fluid-Drive GAS TRUCKS



Developed to peak efficiency in two years of intensive on-the-job testing

Here's proof that YALE gives more for your money!

Only YALE gives you fluid-drive for smooth, powerful operation—longer truck life:

Now you can get the same efficient power transmission used in expensive passenger cars. Smooth, *full* power at any speed—even fully loaded on ramps! No jerky stops and starts—you can work in closer quarters, cut down load breakage, reduce driver fatigue, save tires, *lengthen clutch life 3 to 6 times!*

Only YALE gives you this extra-power combination—hypoid gearing—65HP engine:

Here is a newly developed power team that can handle capacity loads, steep grades, heavy road shock day after day in any weather—and still stay on the job with an absolute minimum of "down time" for maintenance!

Only YALE gives you all these exclusive money-saving features:

Sealed automotive type hydraulic brakes give greater safety. Shockless steering provides easy "passenger car" control. Cold drawn, precision aligned uprights assure smooth, even lifting. *Every* vital part, in fact, has been designed and developed to give you *more truck for your money.*

Now, get your own on-the-job proof:

Now, when manpower, time and production are at a premium, is the time to see for yourself how much more this YALE gas fork truck can do for you. Write for all the facts today.

Capacities up to 10,000 pounds

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I am interested in cutting my materials handling costs.

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YALE

MATERIALS HANDLING DIVISION

IMPORTANT NEW CATALOGS

For Your Working Library . . .

. . . a carefully selected list of manufacturers' bulletins and catalogs to help you keep up to date on new cost-cutting equipment. Tell us which ones you want. Circle the numbers on the coupon on page 276.

Materials Handling Trucks

1 No matter what your product, there's a Colson hand truck designed to handle it. A 60-page brochure illustrates lift jacks, barrel trucks, upenders, bag handlers, dollies, tray trucks, garment racks, and lots of others. There are photos, dimension and capacity tables, and close-up views to show special details. Colson Corp.

Stud Welding Process

2 The Graham stud welding method is fast, strong, and accurate. A tip on the stud eliminates the need for flux. Welds most ferrous or nonferrous metals and their alloys. One circular describes several types of fixed stud welding equipment. Another tells about a portable unit for welding in those tough-to-get-at places. Graham Mfg. Corp.

Mechanical Drive Turbines

3 Dual overspeed protection, weather- and dirtproof bearing seals, and single-helical gearing are just a few features of the Westinghouse line of Gearturbines. Booklet B-4346 discusses versatility of application and tells how you can shave production costs. Photos, dimensions, wheel size and gear ratio tables. Westinghouse Electric Corp.

Stainless Steel

4 Carpenter Stainless No. 20 combines high corrosion resistance to hot sulphuric acid with ease of fabrication. A 20-page bulletin gives the technical details, also contains a summary of field reports from users. A three-page corrosion guide and a list of available forms are included. Photos, graphs, tables. Carpenter Steel Co.

Fasteners

5 You get 100 pages of the latest information on all types of fasteners in Continental's 1951 catalog. Every table of "head dimensions" lists *both* slotted and recessed heads. All data on "tapping screws" is tabulated in a single section. Catalog gives complete technical data, recommended uses, methods of applying, finishing, packaging, etc. Plastic binding permits pages to lie flat when opened. Continental Screw Co.

Conveyor Belting

6 There's more to a conveyor belt than meets the eye. A new 26-page booklet describes the function of each part of the belt, tells how the construction adds to service life. It gives details on belts for various types of materials—oil service, packages, food, grain, industrial elevators. B. F. Goodrich Co.

Magnetic Circuit Breakers

7 The fully magnetic Magnette circuit breaker for lighting panel-boards operates as fast as the current itself, doesn't depend on by-products of the current, such as heat. An 8-page bulletin discusses this and other advantages. Includes detail drawings, descriptions of various models and attachments, performance curves, ordering instructions. Heinemann Electric Co.

Cut-Off Machine

8 You get the complete story on the Delta cutoff machine in a 6-page bulletin. Recommends wheel grades, gives cutting performance data and operating suggestions. Bulletin No. 6888c. Abrasive Wheel Dept., Manhattan Rubber Div., Raybestos-Manhattan, Inc.

Compressor

9 Class O-C horizontal duplex compressors are the *first* to have anti-friction roller bearings throughout, says the maker. The new oil injection system of bearing removal makes it possible. A 26-page bulletin explains the details, covers contraction and regulation. Photos, tables, large cutaway view. Chicago Pneumatic Tool Co.

Lifting Magnets

10 From picking up sprockets in the factory to lifting scrap in the yard, Dings lifting magnets can simplify and speed your handling operations. A new 6-page catalog tells all about the company's new lightweight, all-welded line. Discusses size ranges, lifting capacities construction details. Includes large cross-sectional drawing and installation photos. Dings Magnetic Separator Co.

Leather Belt Selector

11 "Uni-Pull Drive Manual" enables you to select, without any calculation, the proper size of flat leather belt and pulleys for any application. Also contains table on tension controlling motor bases, and other useful information on belting. Installation photos, drawings, sample selection problems, tables. American Leather Belting Assn.

Air Compressors

12 The latest design improvements in Wayne air compressors are discussed in a 20-page booklet covering the company's complete line. Describes performance guarantee, gives selection tips and specifications of all models. Wayne Pump Co.

More on next page

THE NEW Polyken® INDUSTRIAL TAPES

TAILORED TO YOUR JOB

Sealing the cargo compartment of a pressurized plane cabin with *Polyken* No. 223

The tape that put a safety belt around an airplane's air!

Thanks to pressurized cabins—and a new kind of tape—the only breathtaking thing about the high-altitude flights of Braniff International Airways is . . . the service and the scenery.

Yes, we said *tape*. For tape has proved to be not only the best but the most *economical* material for sealing up door cracks, seams, and all air "escape" routes around a plane's pressurized cabin. For a job as vital as this, Braniff sought out a "tape tailored to the job."

Our engineers suggested *Polyken* No. 223. This tape, one of over 100 special *Polyken* tapes, sticks and *stays* stuck—in hot or cold, at ground level or 20,000 feet up. What's more, its tough cloth backing conforms to irregular surfaces and is extremely resistant to abrasion.

Small wonder that *Polyken* No. 223 is the tape specified for this important job on Douglas Aircraft today.

Got a tough job for tape?

We tell you the Braniff story as an example of how tape that's "tailored to your job" can do things you never dreamed tape could do. Let us study *your* problem, and we'll come up with a tape that will save you money, time and effort. That's a challenge. Won't you take us up on it?

GET THIS FREE BOOKLET! To help you find the tape "tailored for your job," write for your free copy of "Tape is a Tool." Address *Polyken*, Dept. FMB, 222 West Adams Street, Chicago 6, Illinois, or see your *Polyken* distributor.

Polyken Industrial Tape, Department of Bauer & Black, Division of The Kendall Company

OUT OUR WAY
MY OWN FAULT? LISSEN, YOU NUMB-SKULL, IF YOU'D PUT SOL-SPEEDI-DRI ON THAT OIL SOAKED FLOOR I WOULDN'T SLIP NO MATTER WHAT!
YOU'D GET HURT IN A PADDED CELL! I SUPPOSE TH' GEARS RAN YOU ALL OVER TH' SHOP TO GRAB YOUR FOOT!
THEM TWO HAVE BEEN ARGUIN' EVER SINCE THEY WAS APPRENTICE BOYS TOGETHER-- I DON'T THINK THE FLOWERS WILL DO MUCH GOOD, DO YOU?
THE OLD BOY COULD AT LEAST SEND FOR A SAMPLE OF SOL-SPEEDI-DRI AND SEE FOR HISSELF
J.R. WILLIAMS
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America's Largest Selling Oil and Grease Absorbent!

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SOL-SPEEDI-DRI is the *sales leader* in the oil and grease absorbent field. Always has been. It makes floors safe for walking, safe for working. Tests conducted by independent laboratories, by large national users, and by ourselves all come out the same—pound for pound, dollar for dollar, SOL-SPEEDI-DRI gives you *more for your money*, all factors considered. Send the coupon for free sample today. Make your own comparisons. Then you, too, will standardize on SOL-SPEEDI-DRI!

SPEEDI-DRI CORP., 210 W. Washington Sq., Phila. 5, Pa.

Warehouse stocks maintained in principal cities of the United States and Canada.

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Inquirers in New York, New England, and New Jersey should write to Speedi-Dri Corp. Elsewhere in U.S. to Waverly Petroleum Products Co., 1724 Chestnut St., Phila. 3, Pa.

FREE SAMPLE: Fill out the coupon and mail today for big, free sample.

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FMM 2-51

NEW CATALOGS FOR YOUR WORKING LIBRARY

Begins on page 270

Conveyor Belting

13 Eight types of conveyor and elevator belting are described in a 16-page brochure. Lists applications for each type. Includes general information on construction, plus complete specification and selection tables, other useful calculating data, and ordering information. Thermoid Co.

Safety Belts

14 There's an M.S.A. safety belt for every purpose: for painters, repairmen working from high scaffolds, and so on. Read about them in a 4-page bulletin containing photos, construction details, size data, and information on accessories. Mine Safe Appliances Co.

Electric Products

15 Everything from lamps to extension cords to connectors is covered in Allied's 1951 catalog. Photos, descriptions, prices, ordering data. In three colors, 24 pages. Allied Electric Products Inc.

Pallet Boxes

16 Generalift pallet boxes can take a big chunk out of your materials handling costs. A 12-page brochure shows how. It illustrates many types of boxes, presents several case studies. Also covers shipping containers. General Box Co.

Hand Trucks

17 Over 70 models of general- and special-purpose hand trucks, skids, and dollies fill the pages of a catalog entitled "Floormaster Trucks." There are standard platform trucks, trucks for odd-shaped castings, trucks with hoppers, trucks with ladders attached. Contains construction data, specifications, and descriptions of floor-protective wheels. Lewis-Shepard Products Inc.

Fork Truck Accessories

18 Two new data sheets describe the special jobs your fork trucks can do with ram and fork extension attachments. Both circulars contain photos, drawings, specification tables. Towmotor Corp.

Squirrel Cage Motors

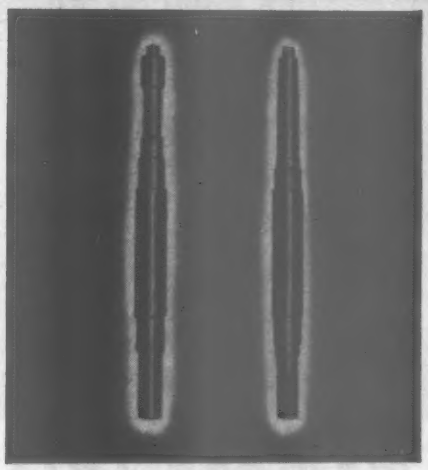
19 Large, two-pole squirrel cage motors—built for boiler feed pumps, oil pipeline pumps, centrifugal blowers, descaling pumps, and

More on next page

How you can safely cut your stockpile needs for machine part replacements

With the *new*, fast, easy-to-use metallizing process, you can quickly build up worn areas on a wide range of parts for machines you *use*, or salvage mis-made parts in equipment you *make*.

47 lbs. of stainless steel salvaged in each spindle by metallizing the small mis-machined sections. With the new, self-bonding Sprabond Wire, it's a 3-step process—just clean, spray and finish.



Worn worm shaft reclaimed by metallizing lasted 75% longer than new because of superior lubricating characteristics of metallized coating.

1 pound of metallized steel saves 15 lbs. in each of these six transmission shifter shafts. No rough-grooving or undercutting needed with the new metallizing process.

Diesel crankshaft saved in 2¾ hours by metallizing with a few pounds of Metcoloy No. 2—a high chrome, high carbon steel.

insurance against production delays

NOW is the time to find out how the *new* metallizing process might help you cope with some of today's (and tomorrow's) maintenance and production problems. It's simpler and easier to use than ever before. A survey of your plant by a Metco Field Engineer will show you just where and how metallizing will help you cut your machine part stockpile needs. No obligation. For further information, write today.

The following trade names are the property of Metallizing Engineering Co., Inc.:
Metco* • Sprabond Wire *REG. U. S. PAT. OFF.

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In Great Britain: METALLIZING EQUIPMENT COMPANY, LTD. Chobham near Woking, England

FREE BULLETIN

R. J. McWaters
Metallizing Engineering Co., Inc.
38-16 30th St., Long Island City 1, New York

Please send free, illustrated Metco Bulletin 54 which shows how metallizing can help save material, time and money on a wide range of machine part repair jobs.

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COMPANY_____
STREET_____
CITY_____ ZONE____ STATE_____

REMEMBER THIS AND SAVE:

Only Smooth Power IS ECONOMICAL POWER!

NO FINER FEATURES

Ultra-precise tolerances... races of chrome alloy electric furnace steel with uniformly fine-grained homogeneous structure... rugged, exactingly balanced, deep grooved ball paths "generated" for true race curvature and polished to super smoothness ... micro-lapped chrome steel balls matched in sets and sphericity to within .000025".

It pays, and pays well, to remember that only from machines that transmit their power smoothly do you get truly efficient, truly economical power. And smooth power can only come from the proper and adequate application of good bearings . . . for example, AHLBERG bearings.

Try, test and compare Ahlberg bearings. We believe you'll decide your dollars can't buy better performance than these fine bearings give. Whether your requirements are for production or maintenance you will find Ahlberg an understanding, complete and capable bearing source. We have served industry—every branch of it—since 1908. We are confident that from this accumulated wealth of experience can be drawn worthwhile savings for you—in reduced operating and maintenance costs of the machines you make or use. Write, wire or 'phone today!

AHLBERG BEARING COMPANY

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NEW CATALOGS FOR YOUR WORKING LIBRARY

Begins on page 270

other high speed drives—are the subjects of a 6-page folder. A cross-section view shows construction details. Photos illustrate motor parts. Allis-Chalmers Mfg. Co.

Blast Cleaning Method

20 How does continuous blast cleaning cut production costs? An 8-page circular lists these answers: By increasing equipment capacity, reducing equipment cost, freeing floor space, saving man-hours, and fitting into production line operations. The booklet tells how Continuous Tumblast works, presents four case studies with production figures. American Wheelabrator & Equipment Corp.

Protective Coatings

21 Ucilon organic coatings are intended primarily for corrosion control and heavy-duty maintenance painting. A 4-page folder describes five types, contains application tips and several industrial case studies. Back page discusses other coatings in the Ucilon line. United Chromium, Inc.

Hand Pallet Trucks

22 For maneuverability and getting into small spaces, there's the Lyon-Raymond hydraulic hand pallet truck. Comes in two capacities, 4000 and 6000 pounds. A two-color circular explains design and construction features, contains photos of the trucks, specifications. Lyon-Raymond Corp.

Anti-Corrosion Metal

23 Wherever corrosion is a problem, Ampco (aluminum bronze) metal may be the solution. Comes in plates and sheets, welding electrodes, pipe and tube; also in products like pumps, plug valves, safety tools, and gaskets. A 4-page data sheet gives the technical details. Photos, tables, graphs. Ampco Metal, Inc.

Locknuts

24 Industry uses over a hundred million locknuts each month to combat vibration. If vibration is one of *your* problems, send for an 18-page catalog describing 23 types of locknuts and their principles of operation. Name of manufacturer is given in each case. Locknut Section, Industrial Fasteners Institute.

More on next page

DO YOU KNOW THESE 5 TIMELY

G-E WIRING FACTS?

1. HOW MUCH EXTRA CURRENT CAN YOU ADD TO EXISTING RACEWAYS?

Size for size, Deltabeston* AVA cables carry more current than ordinary cables—pack more current into raceways—because heat-beating asbestos insulation permits higher operating temperatures. When you specify G-E Deltabeston cables,
HOW MUCH CURRENT CAN YOU ADD?

2. WHAT REALLY MAKES THE DIFFERENCE IN CONDUIT?

Wiring installations get double-protection with General Electric White rigid conduit. First, the top-quality, thoroughly-tested steel pipe is galvanized. Then a tough, smooth coat of Glyptal* lacquer is applied.
BUT WHAT REALLY MAKES THE DIFFERENCE?

ANSWERS

1. ☐ G-E Deltabeston AVA cables can add as much as 64% more current-carrying capacity than ordinary Type R building wire.

2. ☐ G-E White rigid conduit is *hot-dip galvanized* in pure zinc—a premium finish that gives lasting protection.

3. ☐ In laboratory tests General Electric mercury switches stand up under more than a million On and Off cycles—about 247 years of normal use.

4. ☐ The new standard grounding outlet (GE3588) is designed to take three-prong grounding plugs, two-prong polarized plugs, and regular two-prong parallel-blade plugs.

5. ☐ The new line of G-E bar hangers offers you the offset you need. New design lets fixture stud move easily for leveling and positioning, locks it tight when it's set.

FOR FURTHER INFORMATION on any General Electric wiring materials, see your local G-E Construction Materials Distributor, or write to Section K53-234, Construction Materials Department, General Electric Company, Bridgeport 2, Connecticut.

** Registered Trade Mark of General Electric Company*

3. WHAT IS THE TESTED LIFE OF A G-E MERCURY SWITCH?

The silent General Electric mercury switch has no moving blades or contact springs to wear out—a pool of mercury does all the work! Mercury switches provide exceptionally long service—
CAN YOU GUESS HOW LONG?

4. WHAT'S THE NEW STANDARD GROUNDING OUTLET?

For easy installation the new standard G-E twin grounding outlet can be side wired or back wired, but
WHAT'S THE NEW STANDARD?

5. HOW DO YOU POSITION A BOX EXACTLY WHERE YOU WANT IT?

Positioning a box exactly and bringing it to the exact level is now an easy job with the new G-E bar hangers.
HOW'S IT DONE?

GENERAL ELECTRIC

THE *Right* PROTECTION

is DOCKSON HELMETS and HANDSHIELDS

BE SAFE against sparks, flash and dangerous rays of arc welding. DOCKSON HELMETS and HAND SHIELDS are leak-proof, shock-proof, and equipped with Federal specifications plates.

BE COMFORTABLE in roomy, light-weight DOCKSON HELMETS —adjustable, cushioned headgear; form-fitting chin rests; spring pivot holds shield in any position, allows easy raising and lowering.

BE ECONOMICAL, get longer use from DOCKSON HELMETS & HAND SHIELDS . . . every one "BUILT FOR BETTER SERVICE".

THERE IS A DOCKSON DISTRIBUTOR NEAR YOU — Let us send you his name and our catalog of Welding and Cutting Equipment.

Dockson CORPORATION
3839 WABASH • DETROIT 8, MICH.

NEW CATALOGS FOR YOUR WORKING LIBRARY

Begins on page 270

Window Units

25 With Bijur flush-mounted window units for machinery, you get a visual check on liquid level, flow, drip, or movement of internal parts. A 4-page folder illustrates and describes many applications. Includes specifications and installation instructions. Bijur Lubricating Corp.

Inspection Method

26 By-Check nondestructive inspection of metals is as simple as ABCD: A, clean surface; B, apply dye penetrant; C, remove excess dye with special remover; D, apply developer and flaws appear. You'll find all the details and several application photo studies in a 4-page folder. Includes prices. Dy-Check Co., Div. of Northrop Aircraft, Inc.

Water Heaters

27 "Packaged Water Heating" tells about five sizes of heaters that mix steam directly with water to provide instantaneous hot water at controlled temperature. These are all packaged units, complete in themselves. You install them at point of use—for plant washing and cleaning jobs, for showers and washrooms, or as boosters for your own central storage heaters. Folder contains ratings and specifications. O'Brien Steam Specialty Co.

Power Cranes

28 You'll see over 50 industrial applications of Lorain cranes in an illustrated 20-page booklet. It shows them handling steel sheet, sand, scrap, pulpwood, paper, tires, many other materials. Illustrates rubber-tire and crawler-mounted models at work. Thew Shovel Co.

Measuring Instruments

29 Three new catalogs cover Gotham industrial thermometers (No. 100), pressure gages and recorders (No. 400), and temperature controllers (No. 500). All three are indexed, clearly illustrated, and full of descriptive details. Gotham Instruments, Div. of American Machine and Metals, Inc.

Portable Conveyors

30 For stockpiling, truck loading, car unloading, filling bins, etc., there's the Model 362 portable belt conveyor. 8-page bulletin describes design features, other conveying and car unloading equipment. Barber-Greene Co.

Luminaires

31 For attractive, easy-to-start, efficient lighting, check Bulletin DR 2 on Dreadnaught, 2-lamp, semi-direct luminaires. Contains general descriptions, plus detailed test data and mounting drawings. Metalcraft Products Co., Inc.

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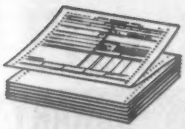
City..... Zone..... State.....



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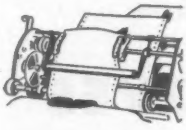

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Registers 2 *different*
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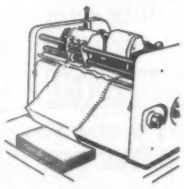

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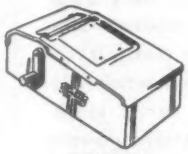
Sign, date, number,
trim, tear off, stack
Kant-Slip forms



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REGISTERS

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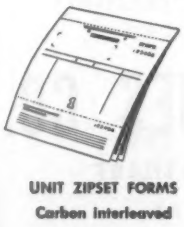
. . . by hand



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Carbon interleaved

How this Plant stopped waste and errors . . . CUT COSTS!

A tabloid story of "Paperwork Simplification"

A leading New Jersey manufacturer suspected that *something* was wrong with *paperwork* in several departments. There seemed to be too many Receiving forms, recopied too often . . . lack of control in Material Requisition . . . too many inaccurate Work Tickets, causing disputes with piece-work employees.

By applying the scientific method of Standard Register's "Paperwork Simplification" this manufacturer solved these and other paperwork problems . . . *completely!* Three separate forms were replaced by *one* five-part *registered* Receiving Report, including an inspection copy and a move order. A register system of consecutive-numbered *Material Requisition* forms now gives "100% control." A new set of forms now completely details job assignments—ending disputes! Time was saved, waste eliminated, costs cut . . . in all operations . . . by *Paperwork Simplification.*

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REGULAR SERIES—From 50 inch lbs. to 300,000 inch lbs. torque. Prevents transmission of overload. Constant torque clutches can be pre-set.

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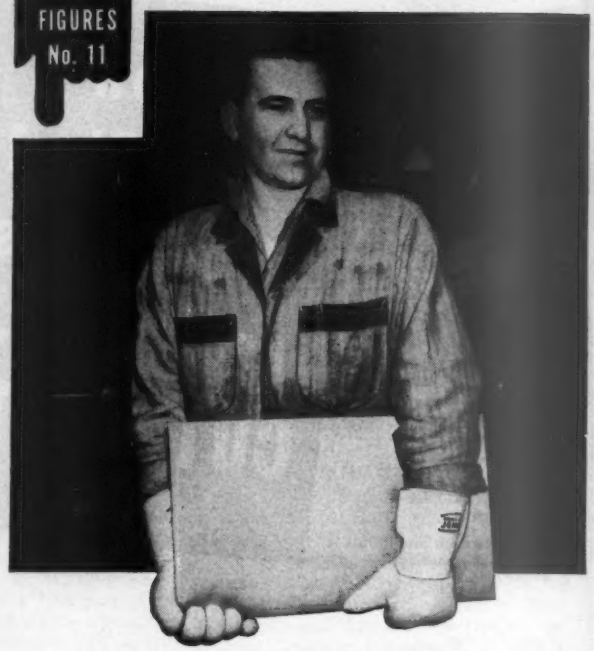
FACTS & FIGURES No. 11



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save 90c per man per workday in handling sheet metal

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*Name on request.

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Dozens of manufacturers swear Jomac gives you more glove per dollar. It's reversible, so you don't have to give up when it's worn on one side. Any two gloves make a pair. Jomac doesn't slip when oil-soaked. Wash or dry clean it . . . you don't have to throw it away when it's dirty. Jomac is the original terry cloth work glove with extra protection woven in. It outwears ordinary work gloves 7 to 1.

If you need protection against heat or cold, rough or sharp edges, it pays to buy Jomac Work Gloves.

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Move or add lights *anytime, anywhere* with BullDog Universal Trol-E-Duct

Meet changing conditions quickly, economically with this truly flexible lighting system.

To move or add lights, simply pick the right spot and insert handy twist-out plug or trolley. Every inch of this money-saving 50-ampere duct system is a tap-off! Prefabricated and standardized in lengths from one to ten feet, it can be dismantled and moved to a new location without scrapping a single part.

Call in your nearby BullDog Field Engineer for more information about this modern lighting system. He will be glad to show you an installation near your own plant. Or write BullDog direct for descriptive literature.

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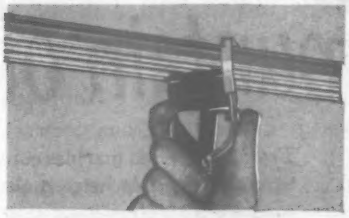

To tap off current at any point along slot, insert twist-out plug and give it 90° turn. Plugs are grounded on steel casing before contacts touch bus bars; narrow access slot protects operator.

Trolley type outlets are used where mobility is essential—for drop-cord lighting in stock bins and inspection areas or small portable tools.

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DRACCO conveyors lower labor costs by reducing personnel necessary to transporting materials. Additional economies are produced by faster transfer of lower-cost bulk materials.

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Designed specifically for economical handling of solid-laden, viscous and mildly corrosive liquids — practically eliminating these 3 major pumping problems. Above are a few typical applications where Carter plunger pumps have been slashing costs for industry.

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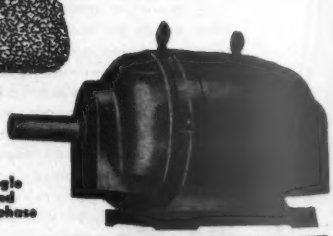

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Fully enclosed Ball Bearings; semi-enclosed construction that protects against dripping and splashing hazards and assures cool, continuous operation. Available in polyphase—from ½ to 60 hp, single phase—from ½ to 5 hp, for wide adaptability of use and greater flexibility in your power planning.

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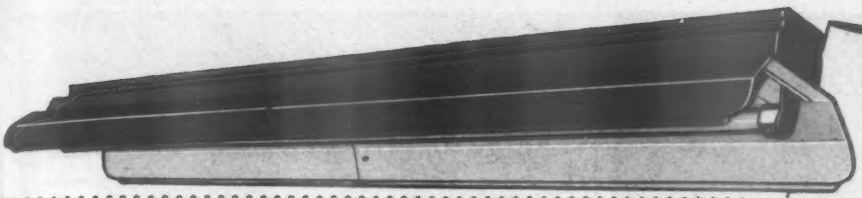
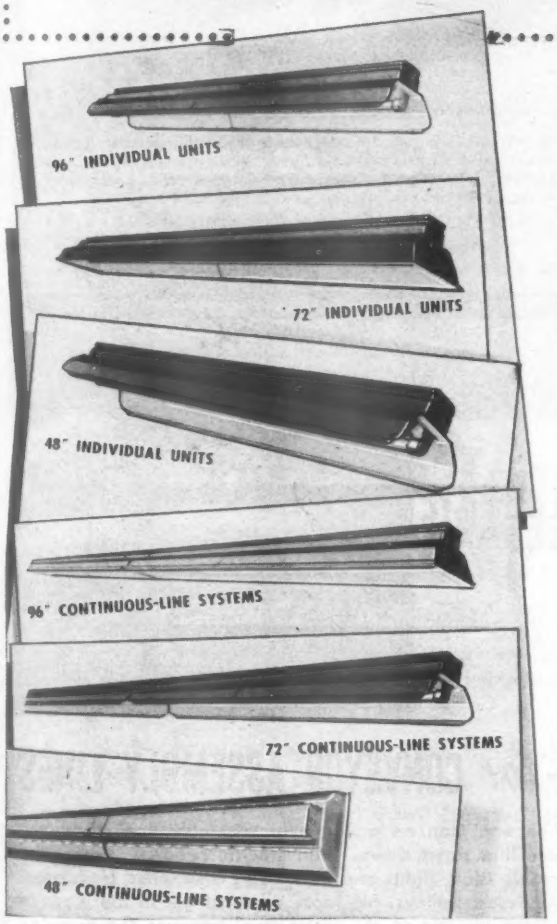


NEW BENJAMIN "MAGNA-FLO" BULLETIN *Available Now!*



Tells Why You Capitalize Fully on the EXTRA EFFICIENCY of the NEW T12 SLIMLINE LAMPS when you specify NEW BENJAMIN "MAGNA-FLO" SYSTEMS

Bulletin MF brings you complete data on the 18 different types of Benjamin "Magna-Flo" Units for the 96", 72" and 48" T12 Slimline Lamps. It describes all the "Magna-Flo" advantages which make possible *higher lighting levels* at lower cost with sustained efficiency.

Of special interest are illustrations, descriptions and other data on the many Benjamin "Magna-Flo" features which enable you to capitalize fully on the extra-efficiency of the new, instant-start, single-pin T12 Slimline Lamps. Among the features described are:

- **The right unit for every installation requirement.** Wide variety of types and sizes! Individual units or continuous lines . . . closed or open-end . . . apertures for brightness control.
- **Speedier lamp maintenance with new single-pin "SPRINGLOX" Lampholders!** Lamp pin contacts cannot get out of order . . . faster lamping and re-lamping . . . eliminates danger of lamps dropping out . . . exclusive with Benjamin!
- **High light reflection factor** of Benjamin "Life-Time" Porcelain Enamel Reflectors (82% minimum).

. . . and of course, as you would expect of any Benjamin Fluorescent Lighting Unit, you get Certified Ballasts for minimum service interruptions; easy-to-clean "Life-Time" Porcelain Enamel Reflectors; RLM-approved open-end reflector contour; famous "built-like-a-battleship" construction for greater structural strength and elimination of channel sag; and all the other plus-values which you naturally associate with Benjamin Quality.

Get all the important facts about "Magna-Flo"—the most modern way to get MORE LIGHT at LOWER COST! Mail the coupon below TODAY!

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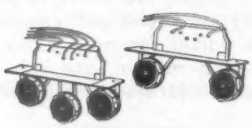
Hand-operated. Permit rapid attachment and detachment of reflector from housing.



"SPRINGLOX" Lampholders
Patented construction greatly simplifies and speeds up lamp insertion and removal.

"Magna-Flo" Units are available for either two or three 48", 72" or 96" T12 Slimline Lamps

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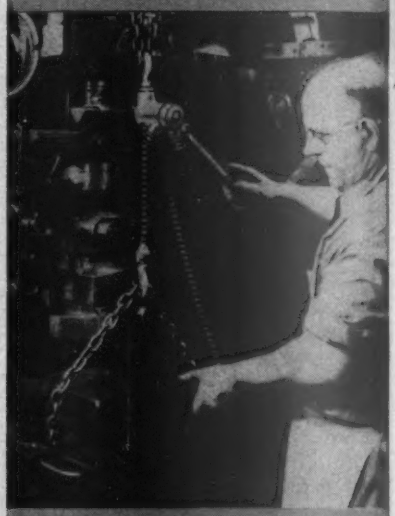

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Easily lifts and shifts heavy tool dies and castings, loads and unloads trucks, is equally efficient on horizontal as well as vertical pulls.

"Hey, Bill, give us a hand"... and a skilled man leaves important production work to struggle with some non-routine lifting job. This practice is costly, dangerous and *unnecessary.* The Coffing Mighty-Midget Puller can be carried anywhere—weighs only 6½ lbs.— hooked anywhere — needs only 8½-in. headroom — handles odd jobs throughout the plant quickly, safely. Lifts as much as three or four men... holds loads securely in any position. Capacity, 500 lbs.— factory-tested at 50% overload. Handle is either lever or high-speed crank.

Keep several of these light, handy tools in your plant. Let them help eliminate production interruptions by providing a safe, sure lift—anywhere. Write for Bulletin M2MP.

LOW PRICE! —$21.75
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COFFING HOIST COMPANY
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Quik-Lift Electric Hoists • Hoist-Alls • Safety-Pull Ratchet Lever Hoists • Spur-Geared Hoists • Differential Chain Hoists • Load Binders • I-Beam Trolleys

For Greater Production Efficiency...
FA POWER PLUGIN
The Midget Size Busduct, Now Available For Three Phase, Four Wire Service

FA Power Plugin, the midget size Busduct is the answer to today's demand for greater plant production efficiency. Available now for 4 wire 3 phase service, 3 wire 3 phase service and 2 wire, single phase, FA Power Plugin provides convenient plugin outlets all along the line, permitting machines to be moved in and out of production lines without slowing down or delaying operations.

FA Power Plugin provides 50 amp., main feeder capacity for ½ to 3 H.P. 240 volt motors, AC or DC, with conventional type fuses, and 7½ H.P. maximum with dual element fuses. In its new design FA Power Plugin also provides 208 volts single phase or three phase for power to motors, and 120 volts for light where individual illumination on machines is desirable. It also provides 120 volts for small pump motors on return lubrication systems.

Underwriters' Laboratories approved, FA Power Plugin is only 3½ inches wide and 2 inches deep in size. It is available in 5- and 10-foot sections with plug-in outlets every 20 inches; additional outlets on special order. Special lengths are also available for application on production benches and machines.

For further information on this new, convenient, flexible and efficient system of power distribution contact your nearest FA representative (he's listed in Sweet's) or write for Bulletin No. 704.

FA TRADE MARK

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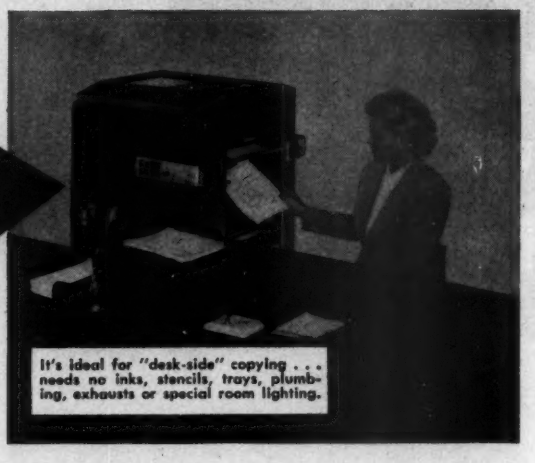
Introducing the BW COPYFLEX®

a NEW machine to simplify copying



It's ideal for "desk-side" copying . . . needs no inks, stencils, trays, plumbing, exhausts or special room lighting.

Uses BW Diazo process, long employed by industry, to make exact low-cost positive copies. *First* machine specifically designed to use this quick, clean, easy process *anywhere* in your office.

▶ In seconds, the BW Copyflex gives you an exact, smudgeproof copy of anything typed, written or drawn.

▶ It's far cheaper and faster than ordinary methods for obtaining 1 to 100 copies. Copies 8½" x 11" in size average less than 2¢ for *all* costs.

▶ Locate it anywhere in your office—it requires no installation. You, your secretary, or anyone else can operate it easily, without special training.

Copying is so simple! If your letter, record, or document to be copied is on ordinary translucent paper, you simply insert it into the machine with BW Copyflex paper. Within seconds you receive a crisp, errorproof, smudgeproof copy — flat, dry, and ready for immediate use. The 100th copy is as sharp as the first.

If your original material is marked on both sides, or is on opaque paper, the machine quickly makes a copy on BW reflex film—which is then used to make as many regular copies as you want.

BW Copyflex is the fastest, most economical way to make 1 to 100 copies of reports, records, orders, invoices—on letterhead, printed form or graph paper. It reduces paper work a hundred ways, saves time and cuts costs. See how BW Copyflex can help you . . . send the coupon today.

Copyright 1951 Charles Bruning Co., Inc.

BRUNING

Specialists in copying since 1897.

CHARLES BRUNING COMPANY, INC.

Dept. F-21 100 Reade Street New York 13, N. Y.

Please send me information on the new BW Copyflex

Name_____ Title_____

Company_____

Street_____

City_____ Zone____ State_____

'Surface' IMMERSION BURNERS

Heats by combustion of gas in tubes submerged in liquid

● The direct contact of the tubes with the fluid permits fast heating and assures exceptional fuel economy.

Available in both suction and atmospheric types. Can be equipped with pilot, spark plug ignition and safeguard equipment.

'Surface' standard immersion burner equipment is available for 2-inch, 3-inch, 4-inch, and 6-inch pipe, in capacities from 30,000 to 230,000 Btu. per hour.

ENGINEERING DATA AND COMPLETE SPECIFICATIONS

Write for Bulletin SC-142

●

60 Types—600 Sizes Gas Burner Equipment for Industry

SURFACE COMBUSTION CORPORATION

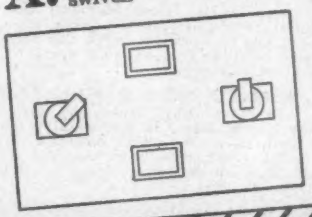
TOLEDO 1, OHIO

Caster Quiz

A "quick facts" feature with helpful suggestions on the use of casters . . . to reduce materials-handling costs, the "Reducible 30%"*

Q. What caster arrangement's best for a truck that must take frequent turns in confined areas?

A. Two stationary and two swivel.



Q. How can maintenance jobs be handled quicker?

A. Via an easy-to-build maintenance truck. The one below is equipped with pipe vise, machinist vise, four roomy drawers and large area underneath . . . ample space to hold any tools and equipment needed. For speedy, easy movement, the truck rolls on 6 in., rubber-tread Bassick Casters ...2 rigid (Series "98") and 2 swivel (Series "99").

Q. What materials-handling scheme permits controlled flow . . . with low cost, easy movement and great flexibility?

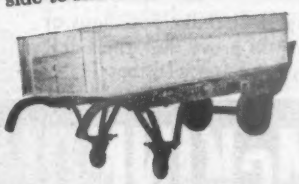
A. Bassick Grooved-Wheel Casters on angle iron track. Track is easily installed, inexpensive, self-cleaning. Bassick Grooved-Wheel Casters work both on track and in direct contact with the floor. Gives controlled movement . . . saves floor space.

Q. How can fragile loads be handled without costly breakage?

A. Try Bassick "Floating-Hub" Casters to "cushion" the load. Their spiral spring absorbs shocks, noise and vibration . . . saves floor wear . . . keeps wheels in constant contact and under load. The safe way to carry scores of breakables . . . glass and china ware, liquids, delicate instruments, loose loads of small parts, etc.

Q. How can two-wheel hand trucks be made handier?

A. Daybrite Lighting, Inc., St. Louis, Mo., adds a pair of Bassick light duty swivel casters on the legs near the handles. This enables the truck to double as a packing table, readily moved from side to side.



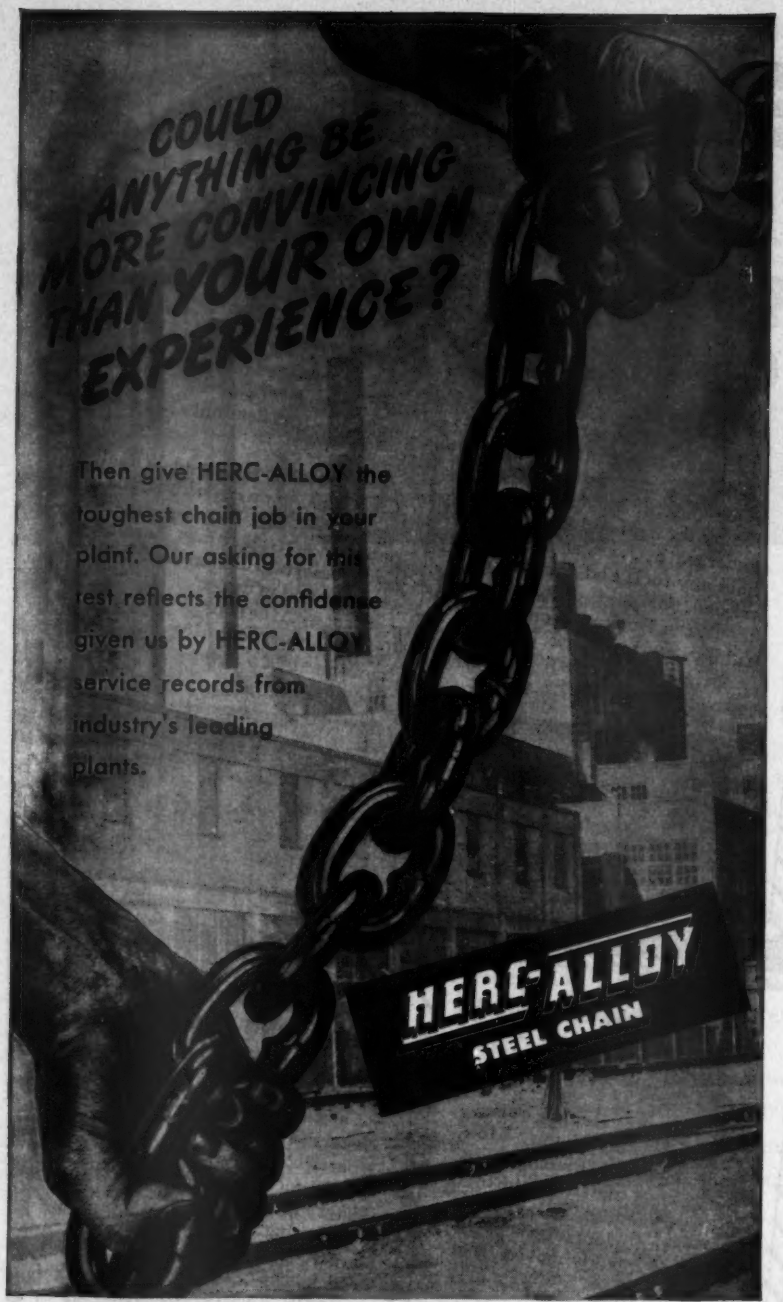
WHAT'S YOUR MATERIALS-HANDLING PROBLEM?

We'll be glad to show you how Bassick Casters can help solve it, or to hear how you've used casters to deal successfully with a particular difficulty. We'll pay $25.00 for any problem or case history that can be used in this advertising. Address the world's largest manufacturer of casters and floor protection equipment . . . THE BASSICK COMPANY, Bridgeport 2, Conn., Division of Stewart-Warner Corp. *In Canada:* Bassick Division, Stewart-Warner-Alemite Corp., Ltd., Belleville, Ont.

*According to cost analysts, materials-handling (about 30% of total cost) affords about the only real opportunities for cost reduction today.

Bassick *Making more kinds of Casters . . . Making Casters do more*

SEE OUR CATALOG IN SWEET'S


COULD ANYTHING BE MORE CONVINCING THAN YOUR OWN EXPERIENCE?
Then give HERC-ALLOY the toughest chain job in your plant. Our asking for this test reflects the confidence given us by HERC-ALLOY service records from industry's leading plants.
HERC-ALLOY
STEEL CHAIN

HERC-ALLOY is America's ***first alloy*** steel chain. For slings or other applications HERC-ALLOY Chain will prove that efficiency, safety and economy can go hand-in-hand.

COLUMBUS McKINNON
CHAIN CORPORATION

(Affiliated with Chisholm-Moore Hoist Corporation)

GENERAL OFFICES AND FACTORIES: TONAWANDA, N. Y.

SALES OFFICES: NEW YORK • CHICAGO • CLEVELAND • SAN FRANCISCO

Other Factories at Angola, New York, St. Catharines, Ontario and Johannesburg, S. A.

Don't Let ATHLETE'S FOOT Bench YOUR Players!

ALTA-CO BUILDS MORE EFFECTIVE TEAMS!

In baseball, track, swimming and *any* sports competition, HEALTHY teams are WINNING teams. ONE member with painful, distracting Athlete's foot can impair the efficiency of your entire team.

Here's the Sound Tested Program for ATHLETE'S FOOT Control:

1. ALTA-CO POWDER
. . . for the all-important foot tub in your shower rooms. One pound to a gallon of water kills common Athlete's Foot fungi *in less than a minute!* Non-irritating; harmless to towels. Easily tested for proper strength with Dolge Alta-Co Powder Tester.

2. ALTA-CO FOOT POWDER
. . . for dusting, gives additional protection against re-infection. Soothes while drying between toes in shoes and socks, this potent but gentle fungicide does its work where Athlete's Foot fungi flourish.

3. ALTA-CO 300 H.D. FUNGICIDE
. . . for your daily, systematic washing of shower room floors. In economical solution (1 to 300), its action is both fungicidal and bactericidal, giving your floors the same hygienic sanitation you demand be taken by each user of your facilities.

Write for 36-page illustrated booklet, "Athlete's Foot—A Public Health Problem."

dependable
DOLGE
WESTPORT, CONNECTICUT

Plant Engineers wanted in East and Middle West

WE have openings for several plant engineers—graduate engineers, M. E. preferred—5 to 20 years' experience in plant engineering. Salaries commensurate with position you can qualify for—periodic salary review on individual merit—comprehensive company paid hospitalization—liberal retirement program and many other advantages. Write enclosing résumé, to:

National Recruiting Division
Box 830, RCA Victor Division
Radio Corporation of America
Camden, New Jersey.

NO, SIR! The Seal Won't Blow!

METALLIC-BACKED neoprene seals are used in this famous bearing—and they are engineered to *stay put.* They can't blow.

Your lubricant stays in; dust and dirt stay out; the result is years and years of trouble-free performance.

The "SC" Bearing is a new member of the Dodge 30,000 hour line. Modern styling. Rugged one-piece cast iron housing. Long inner race. Radial and thrust load capacity. Fully self aligning. *WRITE* for special "SC" bulletin, giving complete specifications.

DODGE MANUFACTURING CORPORATION, 400 Union St., Mishawaka, Ind.

DODGE TYPE "SC" BALL BEARING PILLOW BLOCK

Precision built bearing for small shafts and moderate loads. Pillow blocks, flange bearings and hanger bearings available from distributors' stocks in shaft sizes ranging from 3/4" to 2-7/16".

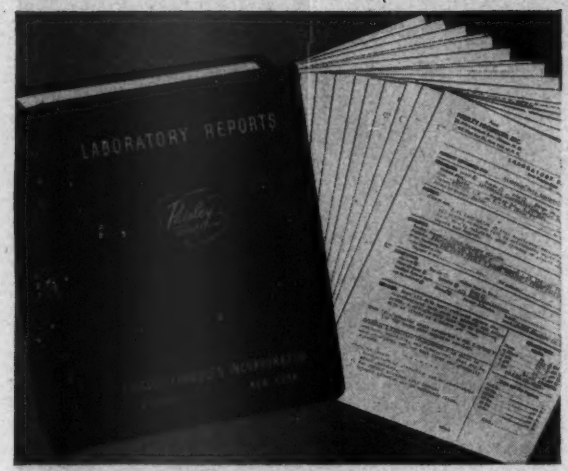
CALL THE TRANSMISSIONEER, your local Dodge Distributor. Factory trained, he can give you valuable assistance on new, cost saving methods. Look for his name under "Power Transmission Equipment" in your classified telephone book.

DODGE

of Mishawaka, Ind.

FIRST IN POWER TRANSMISSION MACHINERY

FOR YOUR NAME PLATE REQUIREMENTS, WRITE OUR SUBSIDIARY,
CHICAGO THRIFT ETCHING CORPORATION, 1555 N. SHEFFIELD AVE., CHICAGO, ILLINOIS.



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Gentlemen: Send us the Laboratory Reports and Data Sheet indicated below.

- ☐ #676—complies with JAN-P-101, JAN-P-140, and JAN-P-120.
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BRAINARD STRAPPING SYSTEM Slashes HANDLING TIME OF HEAVY STEEL STAMPINGS AT NEW BRIGGS PLANT

When the Briggs Manufacturing Company, manufacturers of automobile bodies and plumbing fixtures, opened their new Youngstown plant and began stamping automotive parts for shipment to Detroit for further fabrication, materials handling became a major problem. The stampings produced at Youngstown were heavy steel of irregular sizes and shapes. After considerable experimentation Briggs chose steel strapping. They found that by utilizing the Brainard Strapping System they got maximum protection at minimum costs—plus packaging designed to get the most out of shipping facilities — with the least handling.

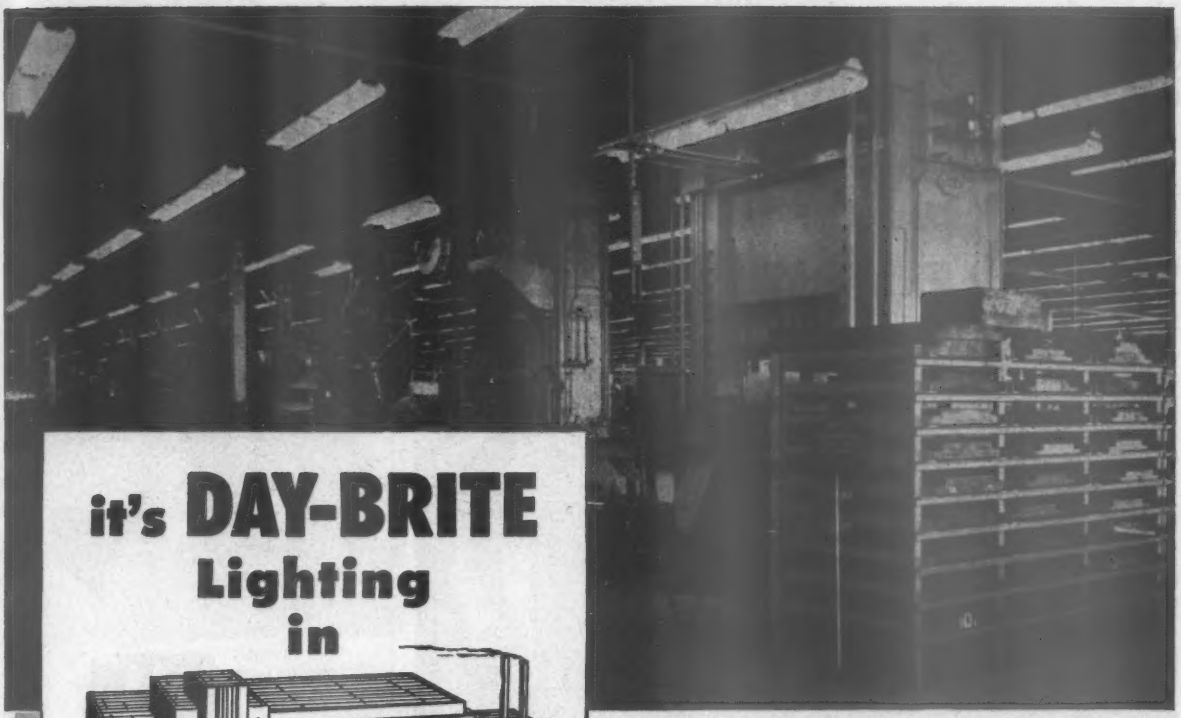
Whatever your packaging problem . . . irregular shapes, heavy, hard-to-handle products or production line packaging you'll find the Brainard Strapping System provides the most inexpensive method for reducing handling time, providing perfect protection and cutting shipping costs.

STEEL STRAPPING DIVISION

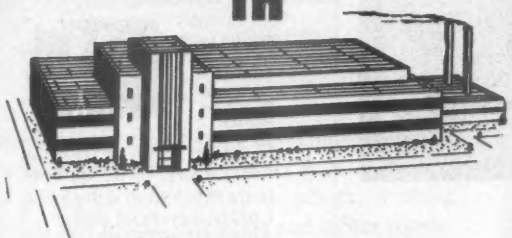
BRAINARD STEEL COMPANY

3121 LARCHMONT AVENUE WARREN, OHIO

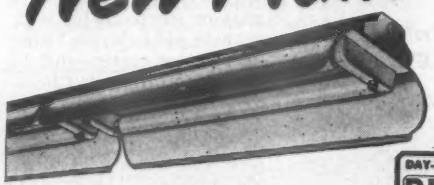
SHARONSTEEL



it's DAY-BRITE Lighting in



still another *New Plant*



DAY-BRITE RLM

THE DAY-BRITE "DAY-LINE"

Die-formed heavy-gauge steel. Reflectors finished in porcelain enamel, reflection factor is 82% or more. Reflectors fasten to channel by two extra-large captive wing nuts . . . easy removal without tools. Channel finished in HOT-BONDED aluminum gray enamel. Wired with certified ballasts (ETL approved), vibration-proof TURRET* sockets (on all 40-watt sizes), and NO-BLINK type starters. Basic, Fill-in and Alternate sections may be assembled to form continuous runs of any length.

** Registered Trade Mark*

Pictured above, you see the punch press line of one of the thousands of new industrial plants that have been springing up all over our still-growing country. The company is proud of the careful planning, the attention to detail that has made this plant a model of industrial efficiency. They're proud, too, of the installation of thousands of top-quality Day-Brite "Day-Line" industrial lighting units—a farsighted investment that is paying handsome dividends.

IS *Your* PLANT LIGHTING PRODUCING OR COSTING?

Is your plant lighting giving you the same competitive advantages that *this* model plant enjoys? Or is it outdated . . . inadequate . . . tough on profits . . . actually costing in terms of excessive spoilage, rejects, and waste? Why let your plant lighting cost you profits when Day-Brite lighting can *help you earn?* Act now! Write Day-Brite today for full information.

Day-Brite Lighting, Inc., 5441 Bulwer Ave., St. Louis 7, Mo. In Canada: Amalgamated Electric Corp., Ltd., Toronto 6, Ont. Distributed nationally by leading electrical wholesalers.

"DECIDEDLY BETTER" DAY-BRITE *Lighting Fixtures*

PREMIUM QUALITY WITHOUT PREMIUM COST

111

SURPRISING SAVINGS*

...Reported by Users of

STANDARD PNEUMATIC TUBE SYSTEMS

Orders — Messages — Money — Merchandise Swiftly and Safely Carried by Air — At Lowest Cost.

*** SAVES $8,000 IN 12 MONTHS:**

Large drug wholesaler increases flow of filled orders per day by 10% — eliminates telephones and attendants — cuts waiting time 50% — with $2,500 pneumatic tube system.

*** SAVES $6,000 IN 2 YEARS:**

Nationally-known electrical supply and appliance distributor speeds shipments — expedites orders — eliminates costly messenger service — with $2,500 pneumatic tube system.

*** SAVES $10,000 IN 9 MONTHS:**

Prominent Midwest optical manufacturing company cuts costs and speeds handling of merchandise, cash, records with $5,000 pneumatic tube system.

The above are representative examples of the substantial savings gained by users of Standard Pneumatic Tube Systems (names of the companies and complete data on operation of the systems given on request).

Department stores, wholesale distributors, hospitals, hotels, mail-order houses, insurance companies, banks, publishers, schools, utilities — rely on Standard Pneumatic Tube Systems for swift, safe transport and communication between departments. These systems have wide application — write for information for your business.

STANDARD CONVEYOR CO.

General Offices: North St. Paul 9, Minn.

Sales and Service in Principal Cities

STANDARD PNEUMATIC TUBE SYSTEMS ARE BUILT BY THE MAKERS OF

Write for Bulletin No. 11 describing representative installations and savings achieved by Standard Pneumatic Tube Systems. Address Dept. FM-851.

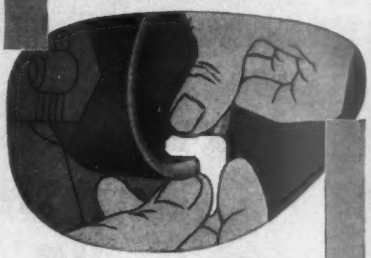
Standard GRAVITY & POWER CONVEYORS

"BETTER MEASURE WITH LUFKIN"

RADIUS MEASURING JOBS COMPLETED FASTER . . . EASIER *with* **LUFKIN**

"5 application" RADIUS GAGES*

**Pioneered by Lufkin*



All LUFKIN *Radius Gage Sets come in durable leatherette protective folders.*

Shops in every section of the country, in all types of industries, are buying *Lufkin* advanced design "5 Application" Radius Gages because each gage permits: (1) Determining radius of inside corners or fillets, (2) Taking radius of outside corners, (3) Checking convex parts with unusual projections where radius is ¼ or more of circle, (4) Using on concave cutter—full ½ or less of a circle, (5) Checking ½ of circumference.

Only with *Lufkin* is each gage a separate unit that can independently and more accurately be applied to the work. In addition, each blade carries the corresponding external and internal forms—the most practical combination.

Lufkin Gage Sets are offered in 5 different combinations of sizes and radii. See them at your Industrial Distributor. Catalog of complete Precision Tool line available on request.

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BUY LUFKIN

TAPES • RULES PRECISION TOOLS

From your Industrial Distributor

THE LUFKIN RULE CO.

SAGINAW, MICH., New York City, Barrie, Ont.

HERE'S WHY ACCOUNTANTS SAY

SPECIAL GREASE-PROOF KENTILE is ideal for lowering maintenance costs

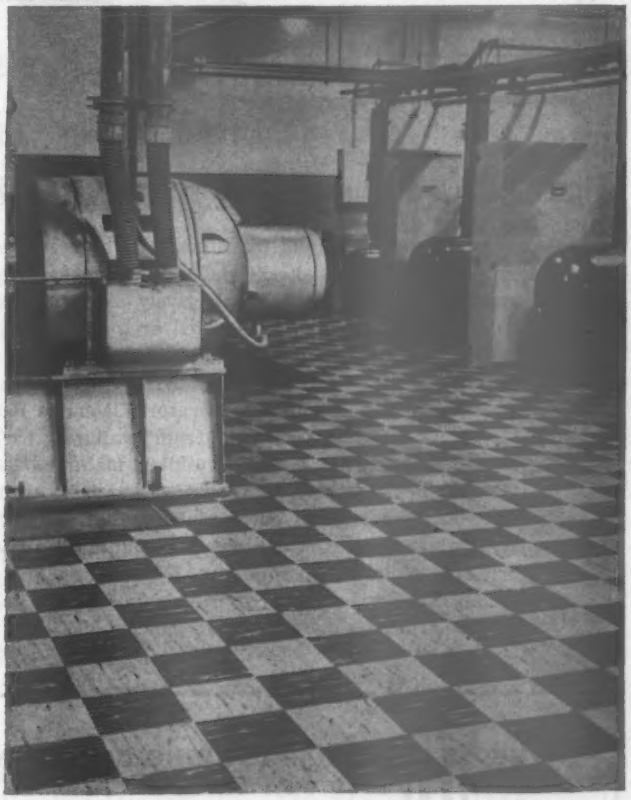
...can be installed for approximately 40¢ a sq. ft!*

Petroleum oils and greases won't stain or soften SPECIAL KENTILE Floors in machine shops, manufacturing areas, laboratories and other spaces where grease and oil are important maintenance factors. That's why maintenance expenses are reduced with floors of SPECIAL KENTILE . . . it's impervious to alcohols, alkalis, most acid solutions as well as petroleum oils and grease. Like regular Kentile it can be installed anywhere . . . over smooth concrete, wood or metal floors . . . even below grade in direct contact with the earth!

Because SPECIAL KENTILE now comes in bright, modern colors, it's the perfect floor to provide a feeling of light and air in plants, working areas, rest rooms, cafeterias and locker rooms. And, a cheerful, pleasant atmosphere means increased efficiency and greater production!

KENTILE adds safety to your floors. According to the U. S. Bureau of Standards no floor is safer to walk on than asphalt tile that does not have a high gloss finish. SPECIAL KENTILE is virtually fireproof, too.

KENBASE completes your floor. Apply it against any smooth wall where it meets the floor to seal cracks and crevices. Never paint it and never worry about marks, chipping or wear.



*Prices for Special Kentile for ⅛" thickness may be considerably lower or slightly higher depending upon the size and condition of your floor and the freight rates to your city. Consult your Kentile Dealer for a FREE estimate. He's listed under FLOORING in your classified phone directory.

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SPECIAL GREASE-PROOF KENTILE®

KENTILE • KENCORK • KENTILE RUBBER TILE

Here's all you need to install most machines!

... when you use ISOMODE* PADS!

You can locate almost all machines anywhere in the plant when you provide for shock- and vibration-absorption with Isomode Pads. They do the job effectively—and at surprisingly low cost! Simply place the required area of these resilient mountings between present machine foot and floor.

And in preventing passage of annoying vibration and damaging impact to floors and to operators, Isomode Pads also reduce noise. They keep machines from "walking", even without hold-downs! They save on building maintenance!

Isomode Pads, molded of Neoprene, resist oil, water—last for years. Thousands of successful installations have been made—under all types of equipment, including high capacity punch presses, looms, compressors! Why not try an installation and actually feel the remarkable results for yourself? Ask us to send you more data and bulletin 405.

*Trade Mark Reg. U.S. Pat. Off.

THE MB MANUFACTURING COMPANY, INC.
1080 State Street, New Haven 11, Conn.

Please send bulletin No. 405 containing more information on Isomode Pads and how to install them easily and quickly.

NAME..... TITLE.....

COMPANY.....

ADDRESS.....

TOUGH FLOORS at LOW COST

"Get a load of this"

Pardon our slang but we feel tough, too, after reading the report on Mulsomastic Floors at Pacific Veneer & Plywood Plant of Canadian Forest Products Limited, New Westminster, B. C.

This Mulsomastic Floor takes 300 tons a day on 2-ton lift trucks—one-ton loads on small "electric jeeps". At one point where the floor is 3 years old and in perfect condition, it is subject to heavy trucks stopping suddenly with loads being thrust upon the front wheels. The trucks then swivel in a small area. Jack Dyer, in charge of maintenance, said to Tremco Man Evan Bignell that any floor standing these conditions is a good floor, and that Mulsomastic is the only material that has met their requirements.

Diagnosis and "Know How" Make Good Floors

We know that Mulsomastic isn't the perfect answer to every floor problem but Tremco men know how to diagnose unusual floor problems and develop sound low-cost remedies. They can instruct your own men, or show a good local contractor how to get the job done right.

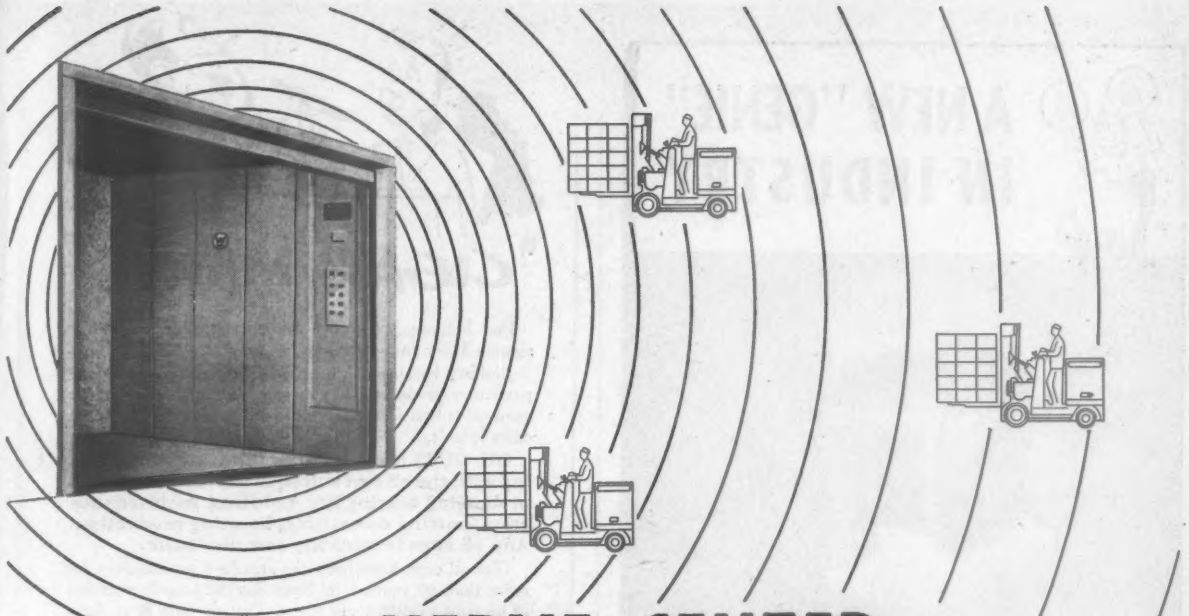
Durability PLUS

Where Mulsomastic is recommended, you not only get a durable floor but one that is resilient, warm, quiet, fireproof, waterproof, non-slippery, vermin-proof, and sanitary. From a patch to an acre, from ⅛" thick up, you can't do better than let the Tremco Man look at your floor problem.

Evan Bignell Tremco Man

UM 1001

TREMCO
Products and Methods for Building Maintenance
THE TREMCO MANUFACTURING CO.
CLEVELAND, OHIO



NERVE CENTER

OF MATERIALS HANDLING SYSTEMS ... WHERE THE HORIZONTAL MEETS THE VERTICAL

The "nerve center" of your materials handling system is the point where "horizontal push" converges with "vertical lift" . . . where hand and power trucks meet your freight elevators.

To keep all "nerves" functioning smoothly and efficiently freight elevators must be an integrated part of your materials handling machinery. Only by combining your horizontal carriers with modern efficient freight elevators can you make maximum reductions in handling costs.

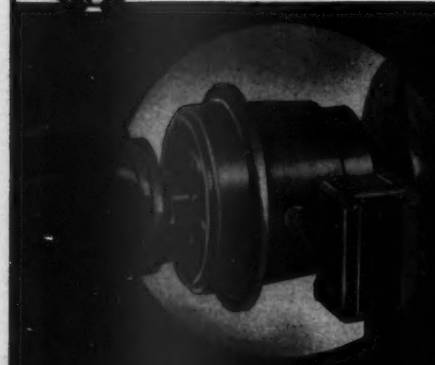
To help you plan your vertical transportation for peak efficiency, Westinghouse offers "The Buyers Guide for Freight Elevators," B-4402. This is the most complete source of vital information available on the proper selection and application of freight elevators. Write on your letterhead to Elevator Division, Westinghouse Electric Corp., Dept. M, Jersey City, N. J.

WESTINGHOUSE FREIGHT ELEVATORS

J-98601

YOU CAN BE SURE ... IF IT'S Westinghouse

A NEW "GENIE" IN INDUSTRY



ANCHOR FLEXIBLE TORQUE-SENSITIVE COUPLING

A NEW TOOL FOR THE MACHINE DESIGNER & BUILDER

For the first time an automatic mechanical control unit, using increasing or decreasing torque requirements as a SIGNAL to start or stop, or initiate speed change of motors, air or hydraulic cylinders.

Operating over a wide range, this torque conscious coupling will control limit switches to cut IN or cut OUT additional power.

Cuts OFF power when work or obstruction overloads machines or conveyors.

Cuts IN or cuts OUT additional power based on torque variations.

Coupling torque range 10 to 2,000 inch-pound.

Pulley type unit torque range 20 to 10,000 inch-pound.

Twelve years in development

WRITE FOR CATALOG NO. 50-A.

ANCHOR STEEL & CONVEYOR CO.
DESIGNERS & MANUFACTURERS
6906 Kingsley Ave., Dearborn, Mich.

"CIGAR, MARY?"

Just because Joe enjoys a good stogie, he shouldn't assume Mary enjoys one, too!

And just because one bearing is best lubricated by one particular grade of oil, you shouldn't assume that the same oil is best for *all* bearings on that machine. In many cases it isn't.

OIL CUPS permit you to lubricate each bearing with the oil best suited to that bearing—thus prolonging bearing life, reducing maintenance costs, cutting down-time, boosting production. And oil cups fortunately *cost very little.*

Gits oil cups have been the standard for industry for more than 40 years. Gits Bros. has the largest selection of oil cups available anywhere. Call on Gits Bros. for a prompt, efficient solution to your lubrication problems.

Write for free Price Guide Catalog

GITS BROS. MFG. CO.
1831 S. Kilbourn Ave. • Chicago 23, Ill.

NO MORE GUESSWORK!

PROCESS TIMING

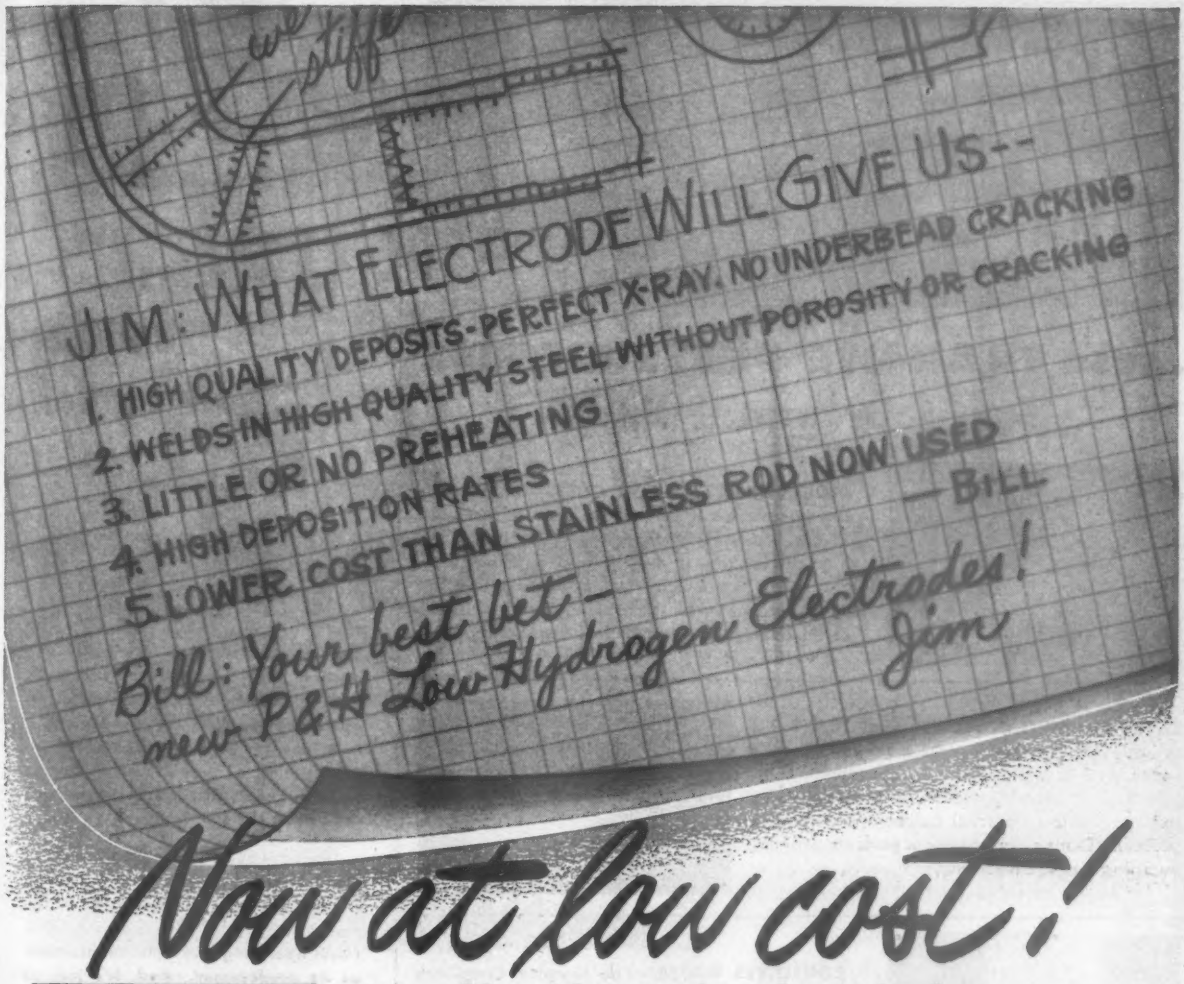
automatically recorded by a Little "TIME CLOCK"

Bolt this 2 lb. Recorder right to the machine itself; Let the "Process" record itself on the chart —(No ink, no pencil, no wires; the record is recorded in wax).

"The cure must be 8½ minutes"—"the heat must be applied exactly 15 minutes"—"the plating must take just 2 minutes"—"the pigment must be mixed just 12 minutes"—etc.

The *Servis Recorder* checks on this—it records just what happened—it "*times the process.*" You are no longer in the dark; from now on you know all day and every day whether your process *timing* is lived up to—or if somebody slipped—if something went wrong to ruin your product for that afternoon, or that whole shift! Write for Process Timing Catalog. The Service Recorder Co., 1375 Euclid Avenue, Cleveland 15, Ohio.

The Servis Recorder
The Time Clock for Machinery


JIM: WHAT ELECTRODE WILL GIVE US--
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2. WELDS IN HIGH QUALITY STEEL WITHOUT POROSITY OR CRACKING
3. LITTLE OR NO PREHEATING
4. HIGH DEPOSITION RATES
5. LOWER COST THAN STAINLESS ROD NOW USED
— BILL
Bill: Your best bet — new P&H Low Hydrogen Electrodes!
Jim

Now at low cost!

P&H

For welds with superior physicals that match special steels, simplify production — —

LOW HYDROGEN ELECTRODES

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Manufacturers prefer them too. They have fewer rejections. Smaller welds for faster production. Fewer types of rods to buy, stock, and supervise. They eliminate trouble with off-analysis steel.

Simplify your welding procedures. Standardize on P&H Low Hydrogen Electrodes. Your costs are lower, your welds better and stronger.

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HARNISCHFEGER CORPORATION

2255

Here are a few of the money-saving P&H Low Hydrogen Electrodes:

- *For problem steels:* High carbon, high sulphur, cold-rolled alloy . . . 70LA and 70LA-2.
- *For steel castings repair;* matches analysis and heat-treating properties of Grade B castings . . . P&H .25C.
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- *For welding nickel-alloy steels;* gives high impact resistance at low temperatures . . . 75LP.
- *For Chrome-moly steels* (1% Cr., ½% Mo.) used in power piping . . . 80LE.
- *For Chrome-moly steels* (2% Cr., 1% Mo.) used in power piping . . . 90LE.
- *To match heat-treating properties of SAE 1040* and like steels. Also for steel-castings repair . . . P&H .40C.
- *For welding high hardenable steels.* Also steel castings repair . . . AW2B.
- *For repair welding Grade C castings* and steels of similar composition . . . P&H-7.
- *Comparable to SAE 8630 steel* . . . excellent heat-treating and flame-hardening characteristics . . . 90LH-2.
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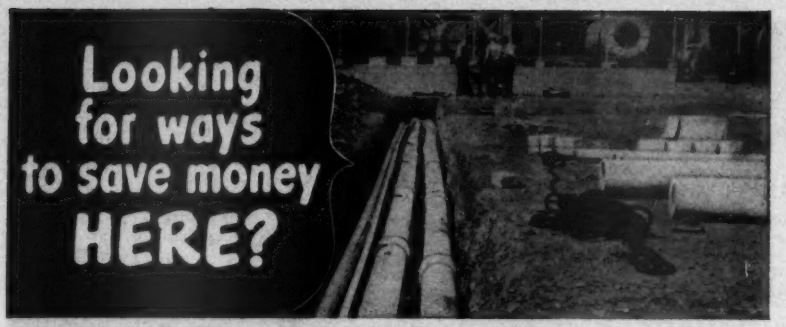
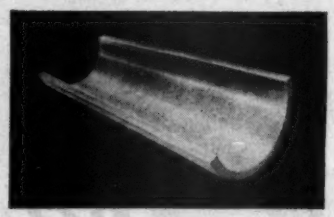
Excavators • Overhead Cranes • Hoists • Arc Welders and Electrodes • Soil Stabilizers • Crawler and Truck Cranes • Diesel Engines
Cane Loaders • Pre-assembled Homes



...use TRANSITE* PRESSURE PIPE for your water lines

REDUCES INSTALLATION COSTS—Your water line goes in fast when you use Transite Pressure Pipe. Crews can lay more pipe per day because Transite is light in weight, easy to handle . . . and Transite's special factory-made joints are simply *assembled* on the job. Time and labor are saved, haulage and installation costs are reduced.

SAVES PUMPING COSTS—Transite Pipe has a smooth interior that insures maximum flow of water. And because of its asbestos-cement composition, progressive reduction in capacity due to tuberculation (internal corrosion) is never a problem. Pumps can operate at peak efficiencies, pumping costs remain low.



CONSERVES WATER—The Simplex Couplings used with Transite Pipe make up tight, stay tight in service. These flexible joints effectively absorb vibration, help compensate for soil movements. Thus, they protect against underground leakage that may damage the system or result in excessive water costs.

CUTS MAINTENANCE COSTS—Transite Pipe is made by a special Johns-Manville process that assures exceptional resistance to corrosion—enables it to stand up where other pipe materials fail. In thousands of industrial and municipal water systems, Transite is proving the money-saving pipe by continuing, year after year, to keep water line maintenance costs to a minimum.

For further information and engineering data, write for brochure TR-11A. Address Johns-Manville, Box 290, New York 16, N. Y.

*Transite is a registered Johns-Manville trade mark.

JM PRODUCTS

Johns-Manville
TRANSITE PRESSURE PIPE
for Water Supply Lines • for Fire Lines • for Process Lines

Not just another new model!

Style sells some items like autos and clothes. But—when it comes to load-lifting equipment, it's the hoist that can stand the gaff that's wanted. A hoist like the original 'Load Lifter'—not a thing of beauty but a sturdy, reliable three-shift worker that was always on the job!

Its successor, the "Series 700" 'Load Lifter' Electric Hoist, is just as rugged, just as dependable for clock-round lifting jobs. Has the same minimum operating and maintenance costs as its predecessor. And, it's just as safe for man, machine, and load.

It's the finest, most versatile, dependable electric hoist that men can build. For convenience in operation, it has push button control with only 24 volts at the push button. Ball bearings throughout assure high efficiency. It has heat-treated helical gearing for greater strength, longer life and quiet, smooth operation. Steel suspensions for greater safety. These are but a few of the many features which make the new 'Load Lifter' Hoist a worthy successor to its famous predecessor.

Write for Bulletin No. 399 for the complete story of the "Series 700" 'Load Lifter' Electric Hoist.

MANNING MAXWELL & MOORE INC. TRADE MARK

'LOAD LIFTER' *Hoists*

MANNING, MAXWELL & MOORE, INC.
MUSKEGON, MICHIGAN

Builders of 'Shaw-Box' Cranes, 'Budgit' and 'Load Lifter' Hoists and other lifting specialties. Makers of 'Ashcroft' Gauges, 'Hancock' Valves, 'Consolidated' Safety and Relief Valves, 'American' Industrial and 'Microsen' Electrical Instruments.

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No fantastic claims . . . no bombastic statements! Simply try 24 Sylvania Fluorescent Tubes of any popular type . . . ask for your "certificate of assurance." If they aren't the best you've ever used . . . in over-all performance . . . send them back with the certificate to your Sylvania supplier and your money will be refunded.

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Yesterday, today and tomorrow Sylvania Fluorescent Tubes give uniform performance, uniform appearance, uniform color, last longer, and stay brighter. For example, under normal operating conditions they last 3 years in stores . . . 6 years in schools.

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for CONTINUOUS ELECTRIC POWER

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Loading a Box-car with Ready Power Equipped Elwell-Parker Hi-Lift Platform Truck

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Modern Diesel-electric locomotives and Ready-Power-equipped electric trucks operate alike. Both generate dependable electric power right on the vehicle; both operate economically; and both excel where long, continuous operation pays off. Your electric trucks will do more work at less cost when equipped with Ready-Power. There are models for every type, size and make of electric truck.

THE READY-POWER CO.

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Sani-Dri Electric HAND DRYERS GIVE YOU Cleaner Washrooms!

Save Towel and Maintenance Costs!

Modern washrooms today are equipped with faster-drying Sani-Dri that dries hands or face with a stream of hot air. No buying or stocking of towels . . . no unsanitary litter or waste containers . . . no fire hazard . . . no paper-clogged soil pipes . . . no servicing of empty towel cabinets. Instead, Sani-Dri provides cleaner, more sanitary washrooms with *automatic 24 hour drying service!* YOU SAVE UP TO 85% OF WASHROOM COSTS!

ONLY SANI-DRI GIVES YOU ALL THESE NEW FEATURES

1. Instant-starting, heavy duty switch with extra "Safety Load Factor."
2. New, faster-drying heating element.
3. New, smaller, oval nozzle produces more concentrated, faster-drying air stream.
4. Life-sealed Ball Bearing motor. Saves maintenance . . . requires no oiling.
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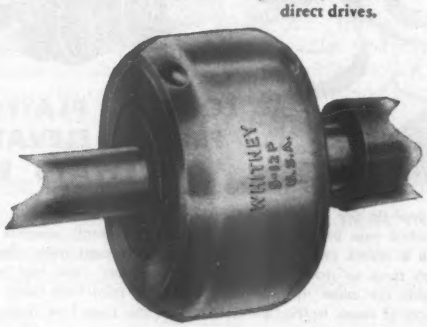
Whitney Cut Tooth Sprockets for all types of chain.



Whitney Roller Chain Flexible Couplings for positive yet flexible direct drives.

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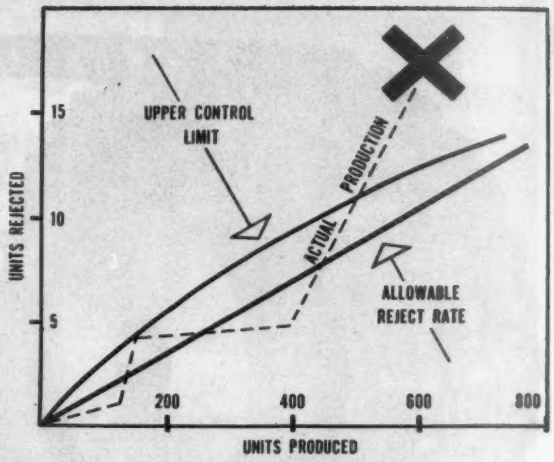
YOUR PRODUCTION IS OUT OF CONTROL WHEN THIS HAPPENS



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Instantly Indicates—when upper control limit is exceeded, enabling you to act at once to stop rejects. It also pinpoints where the trouble is occurring. You set your own control limits.

If you have a quality-control program, you will be glad to know that the G-E Quality-Control Indicator gives you a continuous control chart automatically, enabling you to spot trouble *as it occurs*.

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PRICED FROM **$530.00** LIST

GENERAL ELECTRIC

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LYON-*Raymond* *Hydraulic* Pallet Lift Trucks

Don't let cramped areas slow your handling down — install LYON-Raymond Hydraulic Pallet Lift Trucks and see the difference! These trucks move unit loads through with ease because they're so compact, so maneuverable too. Furnished in hand and electric-powered models — send for full details today!

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HEAVY-DUTY MODEL (similar to photo) Ruggedly-built for heavy-weight unit load handling. In 4000 lb. or 6000 lb. capacities.

ELECTRIC TIERING MODEL Amazing new Space-Maker——so short, so maneuverable it actually right-angle tiers 4-ft. pallets up to 130 inches high in aisles only 6-ft. wide! Capacity 2000 lbs.

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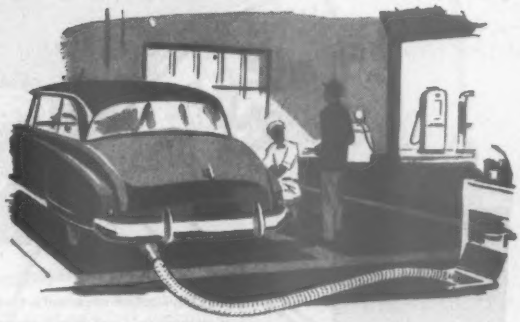
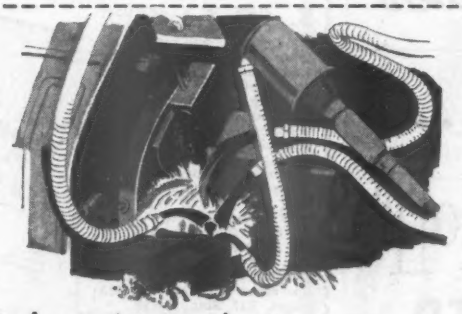
Believe it or not, this machine forms rolls out of dough. Yep, it's a Readco Vacuum Roll Divider and Rounder. In goes the dough—out come the rolls, ready to bake. American Seamless Flexible Bronze Tubing carries the vacuum—which shows that this famous tubing is equally good for carrying "nothing."



Deadly "CO" has to go

Yes, deadly carbon monoxide is carried off safely by this "Monoxivent" exhaust system, built by the Kent-Moore Organization, Inc. American VAC Type Flexible Stainless Steel Tubing, dependably tight and resistant to rust, heat and corrosion, handily connects the car exhaust to the underfloor duct.



Metal-working robot

With uncanny precision and "intelligence" this automatic lathe installed at The Black & Decker Mfg. Co. puts the bite on metal rod while this American Flexible Coolant Line carries oil to the tool edge. To remove damaging particles of metals, the cutting oils and coolants are clarified by a DeLaval Purifier.

This machine can can

Anyway, it can can as long as the motor can. In use at The California Packing Corporation, it's a disc feeder which automatically feeds cans into a fruit canning production line. The motor feed wires are safely tucked away in American Sealtite* Conduit which protects the wires while providing flexibility for belt take-up.

*Trade Mark

THERE'S a type of American Flexible Metal Hose or Tubing for conveying liquids, many chemicals, gases and semisolids under severe conditions of temperature, pressure and frequent movement . . . for protecting wiring and flexible drive shafts . . . for absorbing vibration . . . for connecting misaligned piping and ports. Let us tell you about them in full detail. The American Brass Company, American Metal Hose Branch, Waterbury 20, Connecticut. In Canada: The Canadian Fairbanks-Morse Co., Ltd.

5024B

wherever connectors must move

ANACONDA
from mine to consumer

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FLEXIBLE METAL HOSE AND TUBING

America's technical advancement is always an advantage in any emergency—and now is no exception. Industry realizes the necessity for mechanical efficiency and more effective methods to promote worker welfare. One step in that direction is the installation of the new Halsey Taylor coolers at strategic locations, and fountains for shop or office . . . thus keeping workers constantly refreshed and at top productivity. Write for latest literature.

THE HALSEY W. TAYLOR CO., WARREN, O. 17

Halsey Taylor *Fountains and Coolers*

Wide *or* Narrow...

1 C-F LIFTER HANDLES THEM ALL

Whether your production requires a few or many widths of sheet steel, 1 C-F Lifter, with its wide range of jaw and carrying angle adjustments will probably meet all your sheet handling requirements.

Adjustments are made by the operator in a few seconds, permitting the Lifter to shift from wide to narrow sizes almost instantly.

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Bulletin SL-25 gives you the complete story of C-F Lifter advantages to you. Ask for it today. There's no obligation.

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4. Tells how to organize, operate, and supervise the small plant to secure a maximum of production at a minimum cost per unit. Treats every significant management topic including the considerations in financial planning, laws to be considered in production, sales tools and their use, building employee morale, the know-how rules of machine planning, controlling manufacturing expenses, etc., etc. Edward H. Hempel, Editor, Chairman, Small Plant Committee, American Society of Mechanical Engineers. 499 pages, 45 illus., $6.00

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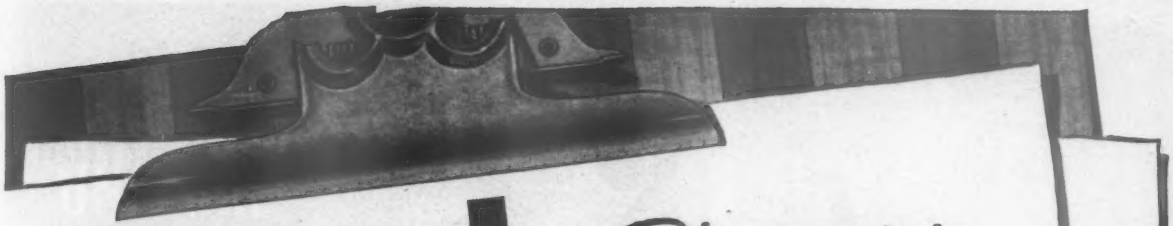
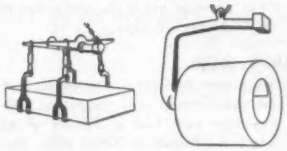
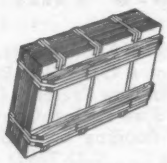
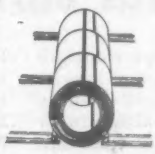
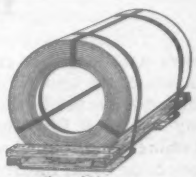
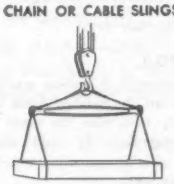
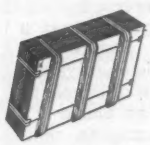
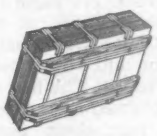
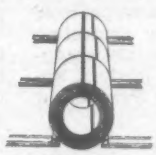
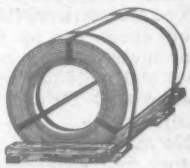
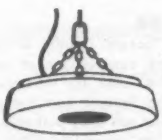
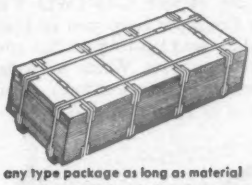
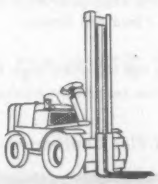
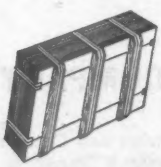


INLAND DATA for STEEL USERS

INLAND STEEL CO.
38 S. Dearborn Street, Chicago 3, Illinois

Packaging your Steel sheets and strip

One way the steel user may be able to reduce the cost of steel delivered to his fabricating equipment, is by specifying the correct type of package the mill should provide. In the final analysis, his handling equipment, storage facilities, method of transportation from mill to plant and end-use of the steel will all have a bearing on the type and weight of package he needs. The following chart illustrates the most generally used types of packages for steel sheets and strip. We are always glad to recommend to the user, the most suitable type of package for the steels we ship.

Type of handling equipment in steel user's plant	The most generally used types of steel mill packages	
	for cut lengths	for coils
Overhead crane with SHEET LIFTER or COIL HOOK 	sheets on lengthwise skids 	cylinder method of loading coils  coil on skid, core horizontal 
Overhead crane with CHAIN OR CABLE SLINGS 	sheets on crosswise skids  sheets on lengthwise skids 	cylinder method of loading coils  coil on skid, core horizontal 
Overhead crane with ELECTRO-MAGNET 	any type package as long as material is securely banded or tied 	flat method of loading coils coil on platform, core vertical
FORK TRUCK 	sheets on crosswise skids 	Ram truck or Fork truck used as ram: cylinder method of loading coil on skid, core horizontal Fork truck: coil on platform, core vertical

fishin' is fun... with care on the run

Here's a fellow that enjoys complete relaxation. He knows his plant is safeguarded from fire . . . a short circuit, a stray spark, a forgotten cigarette or spontaneous combustion can't cut into production time, destroy valuable records or endanger the lives of employees.

You too, can have this same peace of mind about fire by fully protecting your investment in materials, equipment and buildings with modern, approved C-O-TWO Fire Protection Equipment.

No matter what your property . . . factory, mill, warehouse, power station or research center . . . or a particular fire hazard such as spray booth, dip tank, pump room, electrical equipment enclosure or record vault . . . there is a type of C-O-TWO Fire Protection Equipment that gives you fast, positive action the instant fire strikes. Whether it's a C-O-TWO Squeez-Grip Carbon Dioxide Type Fire Extinguisher for an incipient fire, or a C-O-TWO Built-In High Pressure or Low Pressure Carbon Dioxide Type Fire Extinguishing System for total flooding an entire fire hazardous area . . . C-O-TWO means experienced engineering that assures you of the best type equipment for the particular fire hazard concerned.

For example, at many locations a C-O-TWO Combination Smoke Detecting and Fire Extinguishing System is a "must". The first trace of smoke in a protected area sounds an alarm . . . then fast, clean, non-damaging, non-conducting carbon dioxide blankets the fire, putting it out in seconds, before it spreads and causes extensive damage.

So, let an expert C-O-TWO Fire Protection Engineer help you in planning complete and up-to-date fire protection facilities now. Write us today for complete free information . . . our experience is at your disposal.

C-O-TWO

C-O-TWO FIRE EQUIPMENT COMPANY

NEWARK 1 • NEW JERSEY

Sales and Service in the Principal Cities of United States and Canada

Affiliated with Pyrene Manufacturing Company

MANUFACTURERS OF APPROVED FIRE PROTECTION EQUIPMENT

Squeez-Grip Carbon Dioxide Type Fire Extinguishers • Dry Chemical Type Fire Extinguishers
Built-In High Pressure and Low Pressure Carbon Dioxide Type Fire Extinguishing Systems
Built-In Smoke and Heat Fire Detecting Systems

"WE HAVE TO GET MORE PRODUCTION"

THE V.P. EMPHATICALLY STATED
The way orders are coming in we must step up our output.

WORKS MANAGER
We're running an extra shift already and it's getting tougher all the time to get new machines.

V.P.
Then we must get more production from the machines we have.

WORKS MGR.
We better do what I've been suggesting for some time. Let's check our drives. I'm sure we'll find a number of spots where it will pay to install those Rhoads Uni-Pull short center drives.

V.P.
How will they help?

WORKS MGR.
By consistently delivering maximum power. You see, the pivoted motor base automatically maintains the right belt tension, regardless of load fluctuations. They'll give us operating efficiencies up to 97 to 98%.

V.P.
And, what about the belts?

WORKS MGR.
They're Tannate, Leather, of course. That means we can be sure of long service with little need for take-ups. Furthermore, the Tannate belt has great gripping power and more pulling power which adds up to increased production.

V.P.
You better start your drive check up today . . . then call Rhoads.

Write for the new Uni-Pull Drive Manual . . . please use your business letterhead

Producers of Fine Leather for 249 Years

J. E. RHOADS & SONS
35 N. SIXTH ST., PHILA., PA.

A UNITAIRE CONDITIONER

TO MEET ALL YOUR REQUIREMENTS . . .

. . . for increased worker efficiency or customer comfort.

When you buy or specify the Westinghouse UNITAIRE, it will be:

● **SIZED TO FIT YOUR NEEDS.** The UNITAIRE is available in 2-, 3-, 5- and 7½ horsepower capacities.

● **DEPENDABLE.** You are assured of undivided responsibility for all major parts. The Westinghouse Hermetically-Sealed Compressor has an unequalled performance record in thousands of successful installations.

● **ECONOMICAL.** The elimination of belts, pulleys and shaft seals in the Hermetically-Sealed Compressor design means less maintenance and a longer, trouble-free service life.

● **ADAPTABLE.** The UNITAIRE can be installed alone, in multiples, or with duct systems. The addition of a heating coil provides year 'round air conditioning.

● **EASY TO INSTALL.** All sizes fit through a standard door, and require only water, electrical and drain connections before they are ready to operate.

● **COMPACT.** The largest UNITAIRE needs only a little over 8 square feet of floor space, can be fitted into recessed areas.

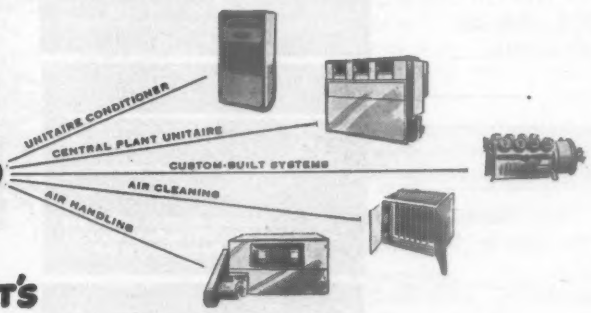
● **QUIET.** The UNITAIRE does not rise above the noise level of an ordinary store or office, and will permit you to shut off outside disturbances by closing doors and windows.

● **ATTRACTIVE.** Modern styling, clean lines and a two-toned gray finish make the UNITAIRE the smartest-looking unit on the market today.

For complete details, call the Westinghouse Air Conditioning Distributor listed in your classified telephone directory, or write Westinghouse Electric Corp., Air Conditioning Division, Hyde Park, Boston 36, Mass.

PUTTING *Air* TO WORK

Only Westinghouse can offer you a *complete* line of air conditioning, air handling and air cleaning equipment.

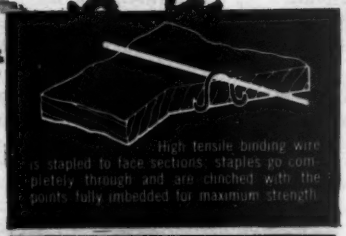


YOU CAN BE SURE...IF IT'S

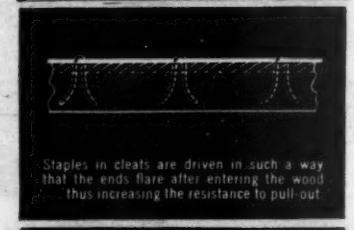
Westinghouse

J-80224

2200 lb. stokers ship safer in WIREBOUNDS



High tensile binding wire is stapled to face sections; staples go completely through and are clinched with the points fully imbedded for maximum strength.



Staples in cleats are driven in such a way that the ends flare after entering the wood thus increasing the resistance to pull-out.

SAVE OVER 50% ON CONTAINER WEIGHT

The versatility of the Wirebound construction principle—the strength of steel with thinner wood—never has been more clearly demonstrated than by the crates specially designed to carry 2,200 pound commercial self-feed stokers manufactured by a well known mid-west producer.* These giant Wirebounds measure 114" x 60" x 36" and are composed of a heavy skid-type base, wrap-around mat and top weighing 218 pounds—282 pounds lighter than the wooden container previously used. The 7/32 inch veneer mat—reinforced with high tensile steel wire—was engineered specifically to reduce shipping damage by affording greater protection. The flexibility of the crate so increases its resistance to the shocks and jars of handling and shipping that these huge stokers are now delivered completely intact, without damage. So whether your shipping problem is "king-size" or compact, a strong, resilient Wirebound can be designed to deliver your goods safely and at lower cost. Get full details today—use the handy coupon below!

WIREBOUND BOX MFRS. ASS'N.

Room 1155, 327 So. La Salle, Chicago 4, Ill.

☐ SEND COMPLETE LITERATURE

☐ SEND A SALES ENGINEER

NAME

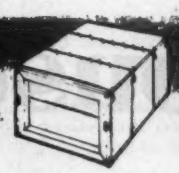
POSITION

FIRM NAME

ADDRESS

CITY ZONE STATE

PRODUCT



*Name on request.

Wirebound
BOXES & CRATES

SIXTY WIREBOUND PLANTS THROUGHOUT THE UNITED STATES

New, Improved

COATED FABRICS

For Many Industrial Uses

For the past 41 years VULCAN has specialized in the development of coated fabrics for a wide range of industrial uses. During the past few years our research laboratories have produced many highly useful new synthetic coatings which are solving problems in such fields as gas and petroleum, printing, and chemical processing.

From the thinnest gauge buna-coated nylon to heaviest neoprene coated cotton, VULCAN research and facilities offer a wide range of special-purpose industrial coated fabrics—either standard in our lines, or made to exact specifications for special applications.

VULCAN also manufactures a broad range of flexible tubing materials, gasket materials of all kinds, and coated fiberglas.

Among many other properties, VULCAN coated fabrics have high resistance to heat, mildew, and chemical action. Many have high burst resistance, or extra long flex life as the application demands.

If you have an application involving special coated fabrics, we invite your inquiries. VULCAN engineers will cooperate in solving your problems. *Write for detailed informative literature.*

VULCAN

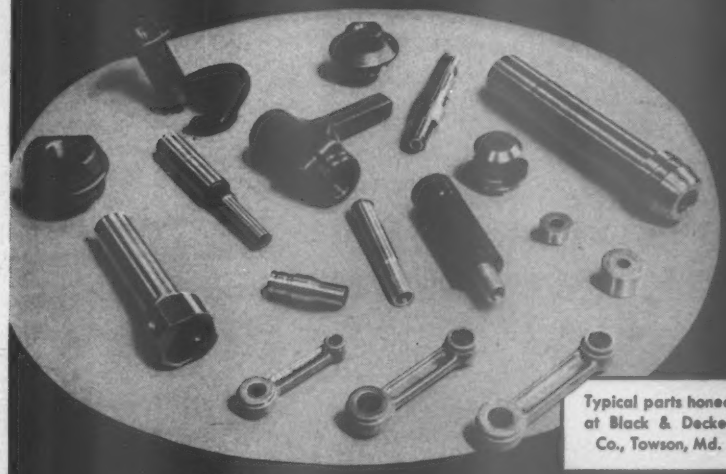
RUBBER PRODUCTS, INC.

(formerly Vulcan Proofing Co.)

First Ave. & 58th Street
Brooklyn 20, N. Y.

Chicago Office:
333 No. Michigan Ave., Chicago 1, Ill.

HOW TO GET LONGER LIFE FROM BUSHINGS and BORES



Typical parts honed at Black & Decker Co., Towson, Md.

SUNNEN HONING

PRODUCES ACCURATE BORES
WITH BETTER WEARING SURFACES

Many manufacturers have greatly increased the wear life of vital machine parts by switching to Sunnen Honing. The reason is simple. With Sunnen honing machines you can produce bores accurate to within .0001", free from taper, out-of-round, and bell-mouth. You get full bearing surface with any required finish—to 2 micro-inches RMS in hardened steel. **That means longer life, smoother running, less heat, higher permissible speeds and loads, and quieter operation.**

USE AVAILABLE MANPOWER. Men *and women* turn out good parts economically and fast on Sunnen honing machines, with very little training. Fixtures are seldom required, and there's practically no set-up time. Changing from one job to another is simple and easy; takes less than five minutes.

HONE METALS, CARBIDES, GLASS. Sunnen honing machines can be used on practically all metals except lead and babbitt. Hone open and blind holes . . . holes with keyways, ports, and lands . . . any diameter from ⅛" to 5½". Investigate Sunnen Honing now; it *may* be the answer to *your* problem, too.

563

FACTORY TRAINED SUNNEN HONING ENGINEERS ARE AVAILABLE FOR CONSULTATION WITHOUT OBLIGATION. SEND THE COUPON FOR DETAILS

SUNNEN PRODUCTS COMPANY
7957 Manchester Ave., St. Louis 17, Mo.

☐ Please send complete information on Sunnen Honing. ☐ Have Your Representative Call.

Name.....Dept.....
Company.....
Address.....
City.....State.....

SUNNEN
PRODUCTS COMPANY
7957 Manchester Avenue
St. Louis 17, Missouri
Canadian Factory—
Chatham, Ontario

Anchor Fence
Protects your plant
from
Trespassers

GUARD your plant against snoopers, trespassers, agitators, troublemakers . . . keep children away from dangerous plant operations . . . protect outdoor stocks . . . control traffic in and out of your grounds . . . with a rugged, good-looking Anchor Chain Link Fence!

Anchor's H-Beam Line Posts are self-draining, rust-resistant, rigid. Deep-Driven Anchors hold the fence firmly erect and in line. Square Frame Gates resist warping or sagging. Square Terminal Posts provide attractive appearance, extra strength and durability. These and many other Anchor Features add up to really *long-lasting* protection for your plant!

Call a trained Anchor Fence engineer to discuss your needs . . . or write for our catalog to ANCHOR POST FENCE DIV., Anchor Post Products, Inc., 6620 Eastern Ave., Baltimore 24, Md.

Anchor Fence

Nation-wide Sales and Erecting Service

QUICK SOLUTION to MANPOWER PROBLEMS

through the SEARCHLIGHT SECTION of this publication. The market place for those offering or wanting the services of men on technical and specialized executives, the SEARCHLIGHT SECTION offers a quick, effective solution to your manpower problems. Because its readership is confined to just the type of men you need, waste circulation is avoided—you reach only the men you want.

•

Classified Advertising Division

FACTORY MANAGEMENT & MAINTENANCE
330 West 42nd St.
New York, N. Y.

PUT YOUR PLANT

AT YOUR FINGERTIPS

WITH SIGNALING via GRAYBAR

Just flick a lever to call or talk with any key employee, anywhere in your plant! Clear, fast communication among your various departments will save many hours of time ordinarily lost in locating personnel, issuing urgent orders, and checking plant operations. Via Graybar, you can get all the proper equipment for every type of voice or code-paging requirement.

From "intercom" to siren

There's Webster Electric Teletalk, an amplified communication system that connects you directly with personnel at selected points in your plant. It relieves switchboard congestion and saves countless steps through two-way or multiple inter-office conversations. There's the Edwards Lokator, a paging system that speeds location of personnel throughout the plant. Installations can be made with a wide variety of signals — from buzzers, musical notes or silent flashing lights to bells, horns, or howlers that will penetrate any plant noise. Or you may like U.S.I. Sound-powered Telephones. For common or selective talking systems, these hand-sets transmit distortion-free conversations over long circuits without external power! A rugged weatherproof set is available with magneto howler signals. For warning, Graybar has Benjamin and Federal sirens. The coupon below will bring you details.

Expert help in planning

There are Graybar offices in more than one hundred cities. Your local Graybar Representative will give you or your electrical contractor complete information on all types of talking, calling, warning, and locating equipment. The help of a Graybar Signaling Specialist is available in choosing the best combination of devices and accessories for your particular need. We offer you similar service in the selection and procurement of supplies for lighting, wiring, ventilation, and other electrical installations.

Send coupon for folder

GRAYBAR ELECTRIC COMPANY, INC. 5010
420 Lexington Ave., New York 17, N. Y.

Please send me your free illustrated folder, "Signaling and Intercommunication Systems for Every Need."

Name_____ Title_____

Company_____

Address_____

City_____ Zone_____ State_____

You get the best of everything electrical
Via GRAYBAR

Put 'em up faster WITH Ramset FASTENING SYSTEM

Starting from scratch, one man can make up to 50 fastenings per hour, into steel or concrete, with RAMSET FASTENING SYSTEM. That means *hours* instead of *days* to put up tool cribs, workbenches, partitions, piping, wiring . . . all those 1000-and-1 hurry-up jobs.

Just insert a RAMSET drive pin or stud and power charge into the light, self-contained RAMSET DUAL-ACTION TOOL. Position it accurately with the adjustable ROTO-SET SAFETY SHIELD. Then *turn* or *tap* . . . the fastener sets instantly, tightly, cleanly. Takes less than a minute from start to finish.

Almost anything that needs anchoring or fastening into concrete floors, walls, ceilings or structural steel can be done faster, easier, at less cost with RAMSET SYSTEM than with ordinary methods.

See DUAL-ACTION in ACTION!

Today, when the pressure is on and fast work is so essential, don't waste time with old-fashioned methods. Let your local RAMSET Specialist do a sample job for you, without cost, to demonstrate the speed, economy and ease of RAMSET SYSTEM. Or ask us for details.

Ramset Fasteners, Inc., 12117 Berea Road, Cleveland 11, Ohio.

Ramset Fastening System
Pioneer in powder-actuated fastening

Changing Address ?

- If you are planning to move, please be sure to let our Circulation Department know about it — and as far in advance as possible.
- It takes time to correct the stencil addressing plate and to make the correction on all our records. So your prompt notification will help us make sure you do not miss copies of FACTORY.
- Be sure to give us your OLD address as well as your NEW address. We need them *both* to make the correction.
- Mail in the coupon if you plan to move. And please fill it in as completely as possible.

THANK YOU!

Circulation Dept.
FACTORY Management and Maintenance
330 West 42d St.
New York 18, N. Y.

Change of Address Notice
(PLEASE PRINT)

On or about_____

my NEW address will be . . .

Street _____

City _____ Zone____

State _____

My OLD address was . . .

Street _____

City _____ Zone____

State _____

_____

Name Here

You pay only once ... see!

No foolin'. I'm really serious about this. When you ship by rail—by Union Pacific—you pay the freight charges and that's the end of it! We don't expect the taxpayers to maintain our right-of-way for us. In fact, we recently set aside over 100 million dollars just for that purpose.

And yet all of us, railroads and their employees too, pay our fair share of taxes, a part of which **do provide and maintain facilities** used by other forms of transportation with which we compete.

• • •

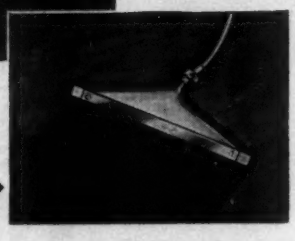
By the way, we're not only set up to give you efficient freight service ... we have traffic specialists, from coast to coast, whose information and helpful suggestions are yours for the asking. Call your nearest Union Pacific freight representative at any time.

Be Specific - Ship "Union Pacific"

Cleaning Costs Too High?

Send for complete details.

Learn what modern cleaning equipment is best suited to your needs.



FOR DRY PICK-UP
This model can be used for rugged cleaning jobs as shown above.

FOR WET PICK-UP
It also takes up suds and mop water, as after cleaning floors.

To meet today's high maintenance costs, General Electric engineers have designed a complete line of heavy-duty vacuum cleaning equipment for industrial plants.

This line includes heavy-duty cleaners of various sizes and capacities, hand cleaners, furnace cleaner, also tools and accessories of many types.

These modern tools are helping management reduce maintenance costs not only in routine cleaning but when used for dust control and for recovery of small debris around machines.

Industrial Cleaners

GENERAL ELECTRIC

MAIL THIS COUPON TODAY

GENERAL ELECTRIC COMPANY, Dept. 22-1323
1285 Boston Avenue, Bridgeport 2, Connecticut

Our most serious cleaning problem is.....

Without obligation, please send complete details on heavy-duty cleaning equipment.....

NAME.....

FIRM.....

ADDRESS.....

CITY..... STATE.....

Searchlight Can Help You:

HUNDREDS of miscellaneous business problems that confront you from time to time, can be quickly and easily solved through the use of the Searchlight Section of this or other McGraw-Hill publications.

The SEARCHLIGHT SECTION Classified Advertising of McGraw-Hill Publications

Can help you by bringing business needs of "opportunities" to the attention of other men associated in executive management, sales and responsible technical, engineering and operating capacities with the industries served by:

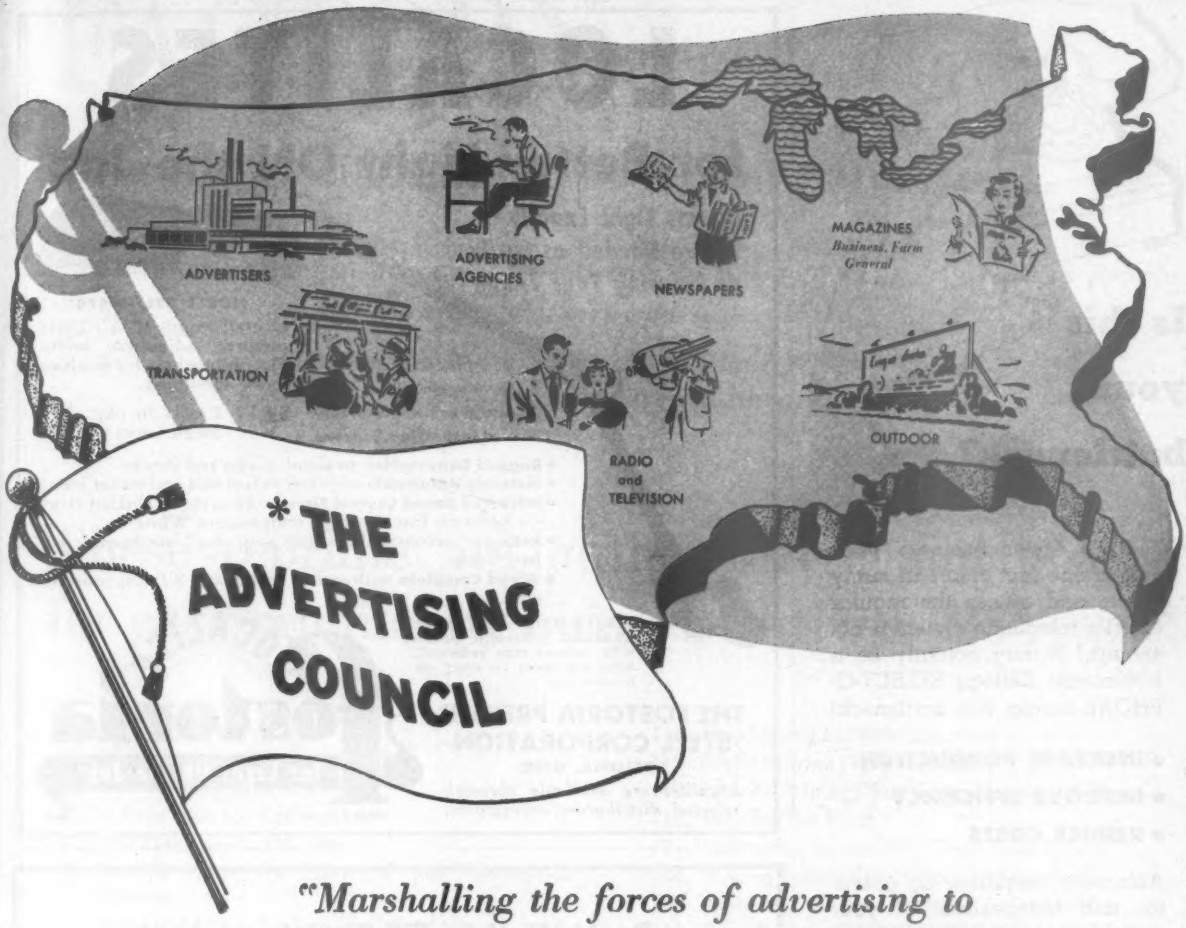
American Machinist
Aviation Week
Business Week
Bus Transportation
Chemical Engineering
Chemical Industries Week
Coal Age
Construction Methods & Equipment
Electrical Construction & Maintenance
Electrical Merchandising
Electrical World
Electronics
Engineering and Mining Journal
Engineering News-Record
E. & M. J. Markets
Factory Management and Maintenance
Fleet Owner
Food Industries
Nucleonics
Operating Engineer
Power
Product Engineering
Textile World
Welding Engineer

The Searchlight Section is the classified advertising appearing in each of these papers. You can use it at small cost, to announce all kinds of business wants of interest to other men in the fields served by these publications. It is the regular meeting place of the man with a miscellaneous business need and the men who can fill that need.

When you want additional employees, want to buy or sell used or surplus equipment, want additional products to manufacture, seek additional capital, or have other miscellaneous business wants — advertise them in the Searchlight Section for quick profitable results!

Classified Advertising Division

McGRAW-HILL PUBLISHING CO., Inc.
330 West 42nd Street New York 18, N. Y.



"Marshalling the forces of advertising to help solve national problems and to make democracy work better . . ."

DO YOU KNOW that the forces of advertising are engaged today in one of the world's greatest jobs of mass education . . . *in the public interest?*

Do you know that these forces for good have been released through the vision and unselfish cooperation of American business—advertisers, advertising agencies, media owners and others?

Hundreds of advertising agencies have volunteered their planning and creative time and facilities. Artists, cartoonists, photo-engravers, printers, typographers and others have contributed their services.

Media owners have donated millions of dollars in space and time. National and local advertisers have sponsored and paid for many millions of public service advertising messages.

As a result, the American people are being alerted as never before to the dangers which threaten from within and from without . . . the dangers of ignorance about our American economic system, intolerance, tuberculosis, school and teacher shortages, etc.

And, at the hub of this great public service effort is *your* organization . . . The Advertising Council.

Advertisers and Media Owners . . . Your Help is Needed!

Right now The Advertising Council has 14 programs in operation. The success of these programs depends on the public spirited and generous cooperation of advertisers and media owners. *Your* help, in the form of space or time donations, will mean a lot to us. And remember . . . *What helps America helps you!*

Yours for the Asking

Write for a copy of Booklet No. 15. It will give you pertinent information about The Advertising Council . . . how it started . . . what it is . . . what it does . . . Or ask for material on specific campaigns. Address:—The Advertising Council, 25 West 45th Street, New York 19, N. Y.

Published in the public interest
by
FACTORY MANAGEMENT AND MAINTENANCE

"A NON-PROFIT ORGANIZATION FORMED TO UTILIZE ADVERTISING IN THE PUBLIC GOOD

Is this your bottleneck?

Today's faster business pace makes one fact clear. In many plants and offices the regular exterior telephone system is not enough! It may actually be a bottleneck! Kellogg SELECT-O-PHONE breaks that bottleneck!

- **INCREASE PRODUCTION**
- **IMPROVE EFFICIENCY**
- **REDUCE COSTS**

Automatic, requiring no operator and independent of your switchboard, SELECT-O-PHONE is the modern means of transmitting orders, of exchanging ideas with individual executives or groups *inside* your business!

GET THE FACTS

Many of the greatest names in commerce and industry are already using SELECT-O-PHONE! For complete information, send coupon today to:

KELLOGG
Select-O-Phone

THE *INSIDE* VOICE OF BUSINESS

SELECT-O-PHONE DIVISION, Dept. J2-B
Kellogg Switchboard and Supply Company
6650 S. Cicero Ave., Chicago 38, Ill.

Please rush data explaining how I can save hours and dollars with SELECT-O-PHONE.

NAME_____

COMPANY_____

CITY_____ ZONE____ STATE_____

LOCALITES
for Better Light ON the Job

Directs Light Exactly Where Needed as Easily as Pointing Your Finger

Designed Especially for Machine Tools, and Work on Assembly and Inspection Benches

MODEL 3267-H-174

Overall length 32¾". Three instantly adjustable joints. Flat oblong base for machine screw mounting.

$6.12 EACH in pkg. of 6 Single Units $7.65 ea.

- **Rugged Construction** to stand strains and shocks
- **Instantly Adjustable** with full swivel ball and socket joints
- **Infra-red Baked Enamel Finish**—Exterior, Wrinkled Gray — Reflector Interior, high temperature White
- **Reflector** accommodates 100 watt A-21 medium screw base lamp
- **Wired Complete** with switch socket and 8 ft. oil resistant cord

WRITE FOR COMPLETE CATALOG of Localite models with various type reflectors, arms and bases for every industrial use.

THE FOSTORIA PRESSED STEEL CORPORATION
FOSTORIA, OHIO

Localites are available through selected distributors everywhere.

LOCALITE fostoria for Light ON the Job

Reg. U. S. Pat. Off.

Don't Wait to Fill That Important

Production or Maintenance Position

An ad in the classified section of FACTORY will place your needs before expert technicians. Act now to catch the next issue closing on the 5th of February.

•

Very low Rates for both displayed and undisplayed ads.

•

WRITE — WIRE — PHONE

FACTORY MANAGEMENT & MAINTENANCE

330 W. 42nd St. New York, N. Y.

FACTORY

offers a management tool you can use...

... to get ideas across to a large number of plant people
... to train workers and supervisors
.. to promote your company's products
... to build your reference library

These reprints are authoritative and geared for easy reading by busy executives. 35c each*

9. Motion Economy
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96. Air Conditioning
99. Lubrication
102. When Foreman Deals With Worker
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106. Better Vision for Greater Efficiency
107. Revamping Electrical Distribution Systems
108. Trolley Conveyors
109. Methods—Time Measurement
111. What Electric Distribution System for Your Plant
112. The Management of Maintenance
113. Principles of Maintenance Control
114. Preplanning for Plant Location
115. Profit Sharing Plans in Industry
117. How to Plan and Run Open House
118. Painting the Plant
121. Telling Employees Why Costs Must Be Cut
124. Making Fullest Use of Electrical Equipment
125. Adopting the Best in Plant Layout—50¢
126. Providing Favorable Working Conditions
127. Make Your Plant a Safe, Pleasant Place to Work
128. Providing the Best in Employee Training
129. Keep Your Plant Up—Keep Your Costs Down —50¢
130. Plan and Control Production
131. Making Fullest Use of Mechanical Service Equipment
133. Wage Incentives
134. Better Handling—a $2-Billion Target—50¢
136. How to Get Your Maintenance Money's Worth—50¢

AND—

we can make reprints available from any past issue of FACTORY, in lots of 100 or more. The cost is low—

Write the Editor.

MAIL THIS COUPON

Editor, FACTORY 1-51
330 West 42nd St., New York 18, N. Y.

Please send me ..... copies each of the reprints represented by the numbers circled, at 35¢ per copy.* I enclose check ( ), money order ( ), for $.....

Name .....

Address .....

City ..... Zone ..... State .....

9, 15, 38, 43, 47, 78, 87, 96, 99, 102, 103, 106, 107, 108, 109, 111, 112, 113, 114, 115, 117, 118, 121, 124, 125, 126, 127, 128, 129, 130, 131, 133, 134, 136

*Except as noted

COLES

*15 ton Coles conveying power cables.

THE NAME THAT CARRIES WEIGHT IN MATERIAL HANDLING!

*LOW HEADROOM from yard into plant.

FROM 1¾ TO 23 TON

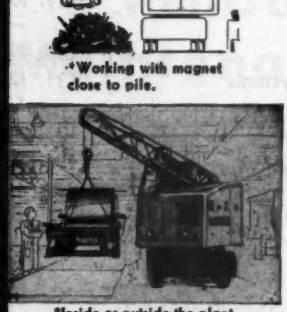
*Handling Railroad Supplies

● PERFORMING a variety of lifting and conveying operations with precision—there's giant-strength and unrivalled maneuverability in every COLES CRANE. 100% concentration on operation is possible as a result of grouped finger-tip controls.

● When you consider ALL AROUND SAFETY, LOW INITIAL INVESTMENT, LOW OPERATION COST, REDUCED MAINTENANCE COST, MINIMUM YARD SPACE... Plus many other advantages—it is no wonder why COLES Mobile Cranes are the first choice among leaders all over the world.

*Working with magnet close to pile.

● Auxiliary attachments such as Grab-hooks, Magnet, and Clam Shovel increase the scope of usefulness of every Coles Crane.



*Inside or outside the plant. Assembly.

COLES CRANES, INC.
4309 South Paulina St.,
Chicago 9, Ill.

COLES CRANES

Symbol of the Finest Material Handling Equipment

Ask YOUR McGRAW-HILL MAN

HOW TO INCREASE the impact OF YOUR ADVERTISING

McGraw-Hill now offers a *3 PLAN* Merchandising Program—it's easy, it's inexpensive and it *works!*

PLAN 1 enables you to promote your business paper advertising among your company management, salesmen, distributors and dealers.

PLAN 2 offers ways to give your advertising extra impact with customers and prospects.

PLAN 3 is for impressing the V.I.P. who controls budget and buying decisions by means of marked issues of the McGraw-Hill magazines you are using.

Complete details in the new McGraw-Hill booklet MERCHANDISING YOUR ADVERTISING. Ask the McGraw-Hill man for a copy.

McGRAW-HILL PUBLICATIONS

330 West 42nd Street
New York 18, N. Y.

NO, Doctor, there is no scientific laboratory formula for media selection. But experienced space buyers do have an effective and time-proven recipe for the profitable investment of advertising money—reasoning, judgement and experience PLUS THE USE OF FACTS. The basic advertising values of publications are reflected in the facts about their circulations. Also there are definite standards, mutually approved by buyers and sellers of advertising, by which circulations may be uniformly measured. Hence circulation facts, when reported in accordance with these standards, provide a dependable guide to sound advertising investments.

The information that makes it possible to measure advertising values based on circulation facts is given in the reports issued by the Audit Bureau of Circulations, a cooperative and nonprofit association of 3300 advertisers, advertising agencies and publishers. The Bureau has a staff of experienced, specially trained circulation auditors who make annual inspections and audits of the circulations of the publisher members. The factual data thus obtained is issued in the A.B.C. reports which are available to advertisers and agencies for use in comparing and selecting media.

Guesswork and waste in advertising are avoided when media is selected on the basis of the facts in A.B.C. reports. This business paper is a member of the Audit Bureau of Circulations. Ask for a copy of our A.B.C. report.

SEND THE RIGHT MESSAGE TO THE RIGHT PEOPLE

Paid subscriptions and renewals, as defined by A.B.C. standards, indicate a reader audience that has responded to a publication's editorial appeal. With the interests of readers thus identified, it becomes possible to reach specialized groups effectively with specialized advertising appeals.

The audited information in A.B.C. reports for business papers includes the following:

How much paid circulation.
How much unpaid circulation.
Prices paid by subscribers.
How the circulation was obtained.
Whether or not premiums were used as circulation inducements.
Where the circulation goes.
A breakdown of subscribers by occupation or business.
How many subscribers renewed.
How many are in arrears.

McGRAW-HILL publications

A.B.C. REPORTS — FACTS AS THE BASIC MEASURE OF ADVERTISING VALUE

BRUNNER
SINCE 1906
AIR CONDITIONING
Pays for Itself
Pays Dividends

In the plant *conditioned air*... controlling temperature and humidity, filtering dust, removing odors and fumes... can be a dividend paying investment by its contributions to better and more production.

In both plant and office the improved efficiency, morale and health of personnel pays a big return on the small cost of Brunner Air Conditioning.

MODEL BAC 30-1
Self contained room type Brunner Air Conditioner. Available in 4 sizes from 3 to 10 HP.

BRUNNER **AIR CONDITIONERS** are at once attractive, compact, quiet, dependable and fully automatic in operation. With steam or hot water heating coil installed within the cabinet it becomes a cold weather heating unit.

Before installing air conditioning *look* and *compare*. *See* and *know* why a Brunner Air Conditioner is today's top buy in conditioned air for your business.

Use this Coupon...

for useful, informative, illustrated literature that tells the "why and how" of air conditioning by Brunner.

Name

Company

Address

City State FM

BRUNNER MANUFACTURING CO.
Utica 1, New York, U.S.A.

Also manufacturers of Remote Type Air Conditioning from 3 to 75 HP., Refrigeration Condensing Units from ⅓ to 75 HP., Air Compressors from ⅓ to 15 HP.

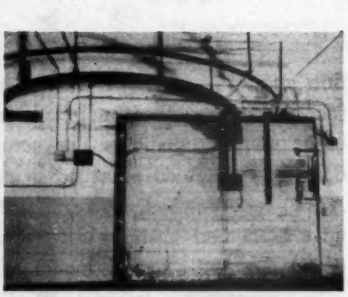
MISCELLANEOUS EQUIPMENT

Begins on page 184

be the answer. It's fabricated from thin-wall stainless steel tubing.

Allied flexible hose is nonmagnetic and corrosion-resistant to steam, water, alcohol, ammonia, and many acids and chemicals. It resists scale formation produced by heat at temperatures up to 2100 degrees F. Sizes range from ¼ inch through 4 inches inner diameter. Two patterns—normal and close pitch—provide for moderate or maximum flexing. Bulletin S-149 tells all.

Allied Metal Hose Co., 37-46 Ninth St., Long Island City 1, N. Y.



Door Opener With Safety Friction Drive

When an obstacle gets in the way the Robot automatic door opener stops opening. This feature provides a safety factor should a door be opened blindly against personnel or property. The Robot friction drive slips until the obstacle is removed or an electrical overload cuts out a few seconds later.

The Robot Operator, Model HCS, can be opened or closed by push-button control or by any one of 10 different magnetic remote controls mounted on cars or trucks. Use of low voltage (12 volts) remote controls is said to reduce installation cost.

Robot Appliances, Inc., 13165 Prospect Ave., Dearborn, Mich.

Process Pump

Pumps in an improved line, known as Type Q, come in capacities ranging from 10 to 1000 gpm. for heads up to 325 ft. These pumps are engineered to handle hot oil, condensate, gasoline, and chemical and process liquors at temperatures up to 800 degrees F.

Available with open, semiopen or enclosed impellers, Type Q pumps are said to be easily dis-

WHERE TO BUY

Featuring additional products, specialties & services for manufacturing plants

THE *Jacques* PRODUCTION CUTTER

SOMETHING NEW!
A 50" semi-automatic power shear to handle the fast, efficient cutting of sheet or roll fed paper, paper board, foils, plastics, laminations, rubber and many other materials. Write today for descriptive literature.
HOBBS MFG. CO.
30 Salisbury St., Worcester 5, Mass.

LIGHT METAL FABRICATING
Here are fabricating and assembly facilities to tie in with your production . . . large or small runs. We welcome work as subcontractors. Send parts, blueprints, or write to:
Warren Steel Specialties Corp.
1313 Niles Ave., Warren, Ohio

RICHARDSON-ALLEN
SELENIUM RECTIFIERS
CONVERT A.C. TO D.C.

— for powering elevators, individual machines, flood lights, plating tanks, scores of factory operations. Write for folders.

RICHARDSON-ALLEN CORPORATION
RECTIFIER SPECIALISTS
116-15 FIFTEENTH AVE., COLLEGE PT., L. I., N.Y.

PAINTS OVER RUST!
RUSTREM STOPS RUST!
No priming, scraping, brushing

Rustrem paints right over rust. For stacks, fire escapes, bridges, fences, flashings, all-metal Farm, auto, marine, machinery. Black, aluminum, clear.

SPECO, Inc. 7308 Associate Ave. Cleveland 9, Ohio

WHERE TO BUY

Featuring many cost-cutting products to help solve production problems

FREE COMPLETE FACTS ON AMAZING MULTI-FLORA ROSE

LIVING FENCES

Sensational hedge that's sweeping America! So dense no person or animal can get through. Beautify your property at low-cost. Keep out intruders, noise. How to plant, pictures, uses, in new FREE booklet. Mail postcard TODAY.
GENEVA GARDENS, 253 Carter Rd., Geneva, N.Y.

CORROSION-PROOF PICKLING TANKS

- Corrosion-proof construction of pickling, process storage tanks; industrial floors.
- Experience serving major steel, chemical, textile, food plants.
- Complete Facilities: Design . . . Engineering . . . Materials . . . Construction . . . Maintenance.

Write for bulletin giving full data
101 Chemsteel Building, Walnut Street, Pittsburgh 32, Pa.

CHEMSTEEL CONSTRUCTION COMPANY, INC.
Specialists in Acid-Proof Construction

SPEED UP YOUR WHOLE PRODUCTION LINE

. . . by adding the right Markem marking machine to it. Markem machines are compactly built, sturdy, quick and easy to operate. Best of all, they mark directly on products, parts, labels, tags and pressure sensitive tapes, enabling you to mark exact quantities swiftly, when needed. Type changes take only seconds on a Markem machine. Inks are quick-drying, durable. No more fuss and delays with transfers, rubber stamps, or preprinted stock. Let Markem show you the easy, economical way to handle your marking problem whatever it may be.

MARKEM MACHINE COMPANY
Keene 33, New Hampshire

NON-EXPLOSIVE, LEAK-PROOF
Protectoseal
SAFETY CANS

Approved by Underwriters' Laboratories and Associated Factory Mutual. Large mouth spout with wide opening cap. Extra safe double walled fire baffle of perforated metal eliminates explosion hazards. Comfortable carrying handle. Electric seam-welded construction for long life. Six sizes from 1 qt. thru 5 gal.

Write for catalog today.

THE PROTECTOSEAL COMPANY
1962 S. WESTERN AVE. ● CHICAGO 8, ILL.

When you're in need of some product or service to speed and improve operation, or save money, you may find it here—in the Where To Buy Section. It pays to check this page . . . *each issue.*

mantled and reassembled without disturbing piping or alignment. Standard models include: bronze fitted, all iron, all bronze, steel, and stainless steel.

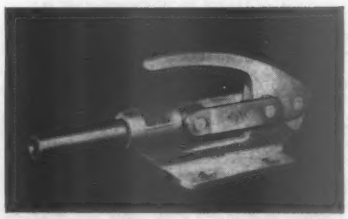
Economy Pumps, Inc., Hamilton-Thomas Corp., Hamilton, Ohio.

Welding Fluxes

Assuming that the least expensive way to better welds is better flux, the Eutectic people claim to have developed a new line of cost saving chemical aids to welding. These Flotectic fluxes are said to reduce surface tension to a greater extent than conventional materials.

Flotectic Flux 1100, included in the line, is said to cut down appreciably the amount of silver solder used per weld. It speeds up production, too, by insuring rapid flow with maximum capillary action. Company Bulletin 106P has full details on the fluxes and their applications.

Eutectic Welding Alloys Corp., 40 Worth St., New York 13.



Plunger-Type Toggle Clamp

Model No. 650 plunger-type toggle clamp has been added to the De-Sta-Co line of work-holding tools. Toggle locking action delivers a holding force of up to 4000 lb. Plunger travels 3 inches. Plunger end is tapped for a ⅝-in. adjustment bolt.

Base and plunger housing, and the handle are high-alloy heat-treated steel castings. Self-feeding lubricator pad on top of plunger housing provides required amount of lubrication.

Detroit Stamping Co., 330 Midland Ave., Detroit 3.

FREE SANITARY SURVEY!

Let your Dolge Service Man make a complete sanitary survey of your premises with a view to helping achieve more effective, efficient, economical maintenance. Send for booklet #11.

DOLGE
WESTPORT, CONNECTICUT

Pipe Repair CLAMPS

Made for every type of leak—any temperature or pressure. Send for Catalog No. 41-O.
M. B. SKINNER CO., SOUTH BEND 21, INDIANA

FLUX
SOLDERING, BRAZING, WELDING
L. B. ALLEN CO., INC.
6781 BRYN MAWR AVE., CHICAGO 31, ILL.

STOP DUST

DUSTKOPS UNIT TYPE LOW COST — **22 Models** 300 cfm to 10,000 cfm ¼ hp to 15 hp.

AVAILABLE FROM STOCK
For: Grinders, buffers, polishers, woodworking, lint . . . ALL DUSTS

Send for Cat. 605f; describe problem.
AGET-DETROIT CO. • ANN ARBOR, MICH.

WATCHES
THOSE DEPENDABLE
MEYLANS

Large assortment for industrial uses. Ask for FREE catalogue No. 12F illustrating and describing "MEYLAN" Stopwatches.

MEYLAN STOPWATCH COMPANY
268 West 40th Street, New York City 18, N. Y.

ENGINEERS
AND
PLANNERS
NEEDED FOR GUIDED MISSILE PRODUCTION

MECHANICAL ENGINEERS

experienced in the production design of precision instruments, gyroscopes, servo systems, or precision hydraulic power equipment.

ELECTRONIC ENGINEERS

experienced in the production design of miniature electronic assemblies or radar.

TEST ENGINEERS

experienced in the design of production test equipment for precision mechanical or electronic assemblies. Fields of interest include dynamic and static balance, system and functional testing, complicated electronic circuitry, hydraulics, and precision electro-mechanical devices.

TOOL ENGINEERS AND TOOL PLANNERS

experienced in tooling piecepartsand assemblies for small, precision mechanical or electronic components.

PRODUCTION ENGINEERS MECHANICAL OR ELECTRICAL

experienced in operation analysis, methods, procedures, and plant layout for small, precision mechanical or electrical components.

PLASTICS ENGINEERS

experienced in all standard materials and techniques, including potting and impregnation.

A New Essential, Strategic Industry; Backed by Large-scale Research Program; Commercial as Well as Military Applications; New Plant and Facilities; Plenty of Opportunity for Advancement in an Expanding New Department of H.A.C.

Mail letters of application immediately, with résumé of experience to:

D. C. HIERATH
Department 29A

HUGHES AIRCRAFT COMPANY
Culver City, California

ALL LETTERS WILL BE ANSWERED

SEARCHLIGHT SECTION

(Classified Advertising)

EMPLOYMENT: BUSINESS: **"OPPORTUNITIES"** EQUIPMENT: USED OR RESALE

UNDISPLAYED —RATES— DISPLAYED

$1.50 per line, minimum 4 lines. To figure advance payment count 5 average words as a line.
Employment Wanted and Individual Selling Opportunity undisplayed rate is one-half of above rate, payable in advance.
Box Numbers—count as 1 line.
Discount of 10% if full payment is made in advance for 4 consecutive insertions.
Equipment Wanted or **For Sale** Advertisements acceptable only in Displayed Style.

Individual Spaces with border rules for prominent display and advertisements.
The advertising rate is $18.00 per inch for all advertising appearing on other than a contract basis. Contract rates quoted on request.
An advertising inch is measured ⅞" vertically on a column. 3 columns—30 inches—to a page. New Ads received by February 8th at the N. Y. Office, 330 W. 42 St., N. Y. 18, will appear in the March issue subject to space limitations.

WANTED
LAYOUT AND METHODS ENGINEER

Engineer experienced in time study, cost estimating, materials handling, and especially layout using templets and 3 dimensional models.

Excellent opportunity for advancement with a progressive internationally known rubber company. Prefer engineer 30-40 years of age. Write giving full background of education and experience, together with salary required, to

P-8384, Factory Management & Maintenance
520 N. Michigan Ave., Chicago 11, Ill.

MANAGEMENT CONSULTING

Established management consultant seeks an engineer with the following qualifications: electrical, mechanical or industrial engineering degree and preferably graduate training. At least 5 years' experience with one or more manufacturers of electronic or electrical components in one or more of these areas: industrial engineering, production management, plant engineering or process engineering. Must be willing to travel. Base Chicago or New York. Salary open.

ADDRESS P-8560
Factory Management and Maint.
520 N. Michigan Ave., Chicago 11, Ill.

INDUSTRIAL ENGINEER

Must be able to develop, install and arrange for maintenance of incentive standards and rates. Five to ten years' factory experience is essential; foundry experience desirable. Can advance from this job to Factory Superintendent and Factory Manager.

P-8803, Factory Management & Maintenance
330 W. 42nd St., New York 18, N. Y.

INDUSTRIAL ENGINEERS

Large, century-old metals industry with comprehensive industrial engineering plan is expanding its field, requires engineers. Recent graduates acceptable; will be trained. Several midwest plants.

P-8666 Factory Management & Maintenance
520 N. Michigan Ave., Chicago 11, Ill.

REPLIES (Box No.):
Address to office nearest you
NEW YORK: 330 W. 42 St. (18)
CHICAGO: 520 N. Michigan Ave. (11)
SAN FRANCISCO: 68 Post St. (4)

POSITIONS VACANT

PRODUCTION SUPERVISORS: Established chemical company has challenging opportunities in expanding plant near Buffalo, New York. Manufacturing plastic film. Chemical or Mechanical Engineering experience desirable. Age 25-35. P 8601, Factory Management & Maint.

ENGINEER, 51, available for execution of large industrial expansion program. P 8655, Factory Management & Maint.

WANTED: EXPERIENCED Power Plant Superintendent with paper mill experience for large mill in South. Initiative and capable handler of men are primary qualifications. Age preference 38 to 50. Contact by writing P 8679, Factory Management & Maint.

WANTED—PLANT Engineer, for expanding, progressive textile manufacturing concern—excellent opportunity for man with plant experience, initiative and ability to supervise. College background and finishing plant experience desirable. Must be thoroughly familiar with operation of steam boilers and water treating plants. In reply give full work experience, educational background, personal data and availability for interviews. All replies kept confidential. P-8804, Factory Management & Maint.

(Continued on the opposite page)

INDUSTRIAL ENGINEER

We are seeking an experienced Industrial Engineer to add to our permanent staff. Will handle Industrial Engineering and Production work with clients. Desire experience in Time Study, Incentives, Factory Cost Control and Statistical Quality Control. Must have successful background in industry. Engineering degree. We are an established, reputable, management consulting firm in Chicago. Write about background in detail. Replies are confidential.

P8239 Factory Management & Maintenance
520 N. Michigan Ave. Chicago 11, Ill.

(Continued from opposite page)

EMPLOYMENT SERVICE

SALARIED PERSONNEL, $3,000-$25,000. This confidential service, established 1927 is geared to needs of high grade men who seek a change of connection under conditions assuring, if employed, full protection to present position. Send name and address only for details. Personal consultation invited. Jira Thayer Jennings, Dept. D, 241 Orange St., New Haven, Conn.

POSITIONS WANTED

EXECUTIVE EXPERIENCED as Chief Metallurgist, tractor industry, production supervisor and management of high alloy foundry plus sales engineering, desires position with progressive organization. Production minded and cooperative. PW 8711, Factory Management & Maint.

PLANT MANAGER—25 years industrial experience in production, engineering, organization and management—extensive activity establishing plants in Europe and U.S.A.—Desire small plant connection in average size city. PW 8677, Factory Management & Maint.

EXECUTIVE ASSISTANT—Sound background in administration and management functions as Chief Industrial Engineer. 15 years experience with two prominent chemical, process and packaging companies. Master's Degree in Business Management. Age 38, married. PW-8749, Factory Management & Maint.

PLANT MANAGER — Graduate engineer, licensed P.E., age 46, 23 years executive experience in machinery manufacturing including general management. Broad knowledge machine shop and foundry operations, incentives, cost control, production, labor relations. Capable organizer and administrator with excellent record. PW-8760, Factory Management & Maint.

SPECIAL SERVICE

Time Study Equipment

Boards with U.C.E.Z. Watch. Stop Watches. Slide Rules. Pedometers. Large selection of T.S. forms in Stock. Write for Prices. Oznam Products, 5244 S. Homan Ave., Chicago 29, Ill.

POSITION WANTED
Plant or Cost and Production Manager

M. I. T. graduate with twenty years experience in plant management including production, planning costs, Purchasing, incentives and labor relations.

PW-8720, Factory Management & Maintenance
520 N. Michigan Ave., Chicago 11, Ill.

SALES AGENCY
PHILADELPHIA DISTRICT

Desires to represent one or two additional manufacturers of equipment or supplies to industry. Special attention to plants engaged with defense orders.

W. A. McMICHAELS CO.
6932 Market St. • Upper Darby, Penna.

THE FATIGUE ALLOWANCE IN INDUSTRIAL TIME STUDY
by MATTHEW A. PAYNE

66 page booklet believed to be the most comprehensive treatment of the fatigue allowance in print. $2.50 plus 6¢ postage in U.S.
ORDER DIRECT—M. A. PAYNE CO.
13777 EUCLID AVE., CLEVELAND 12, O.

SALARIED POSITIONS $3,500 — $35,000

We offer the original personal employment service (established 41 years). Procedure of highest ethical standards is individualized to your personal requirements. Identity covered; present position protected. Ask for particulars.

R. W. BIXBY, Inc. 276 Dun Bldg., Buffalo 2, N.Y.

EXECUTIVES AND TECHNICAL MEN
Desiring Positions with Stability

We solicit inquiries from qualified candidates who desire to contact employers for positions paying $5000 to $25,000 per year. Confidential Est. 34 years.
(Inquiries from Employers entail no obligation)
THE NATIONAL BUSINESS BOURSE
20 W. Jackson Blvd., Chicago 4

Factory Mgr. Machining—Stampings $15,000; Chief Engr. Die Casting $10,000; Chief Engr.—Hardware & Automotive Products $12,000; Sr. Tool Designer—Die Casting $8,000; Foundry Supt. Grey Iron $7500; General Foreman—Assemblies $6500; 2 Metallurgists West Coast $7500-$8500; Manufacturing Engineer $12,000; many positions for Industrial Engrs., Timestudy Men, Designers, Draftsmen. Employer pays your fee in most cases. Confidential.
HARRISON PERSONNEL SERVICE
20 W. Jackson Blvd. Chicago 4

NEW
Guaranteed Rebuilt
MOTORS-GENERATORS-CONTROLS
NOW IN STOCK
We buy surplus equipment
L.J. LAND Inc.
Box 756 Reading-6 Pa.

AIR COMPRESSORS
VACUUM PUMPS
BE SAFE BUY
"AMERICAN" REBUILTS
Distinguished for Reliability
SINCE 1902
ALL MAKES — ONE QUALITY
¼ HP to 500 HP
5 P.S.I. to 3000 P.S.I.
ALL SIZES
STATIONARY — PORTABLE
SALES • RENTAL
RENTAL PURCHASE

SPECIAL
195CFM—130#—9x9 PENNSYLVANIA SYNCHRONOUS MOTOR DRIVEN WITH STARTER

American Air Compressor Corp.
4700-4800 Dell Ave., North Bergen, N. J.

MOTORS, GENERATORS, TRANSFORMERS

1 — 1500 H.P.
Bought and Sold
New and Rebuilt
ELECTRIC EQUIPMENT CO.
ROCHESTER 1, N. Y.

—TRANSFORMERS—
BOUGHT AND SOLD

We carry a large stock of transformers, and invite your inquiries. New Transformers built to your specifications.
PIONEER TRANSFORMER REBUILDERS
We rewind, repair and redesign all makes and sizes.
One Year Guarantee.
THE ELECTRIC SERVICE CO., INC.
"AMERICA'S USED TRANSFORMER CLEARING HOUSE"
SINCE 1912 CINCINNATI 27, OHIO

INDUSTRIAL CONSULTANTS

WALLACE CLARK & COMPANY
Incorporated
Management Consultants
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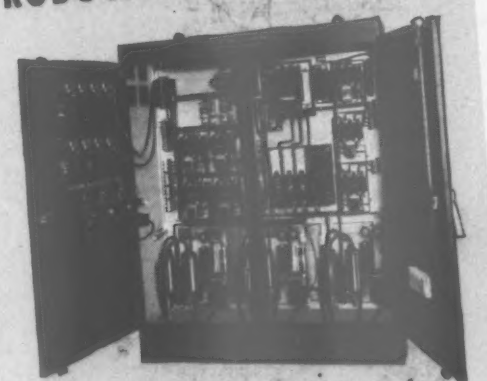

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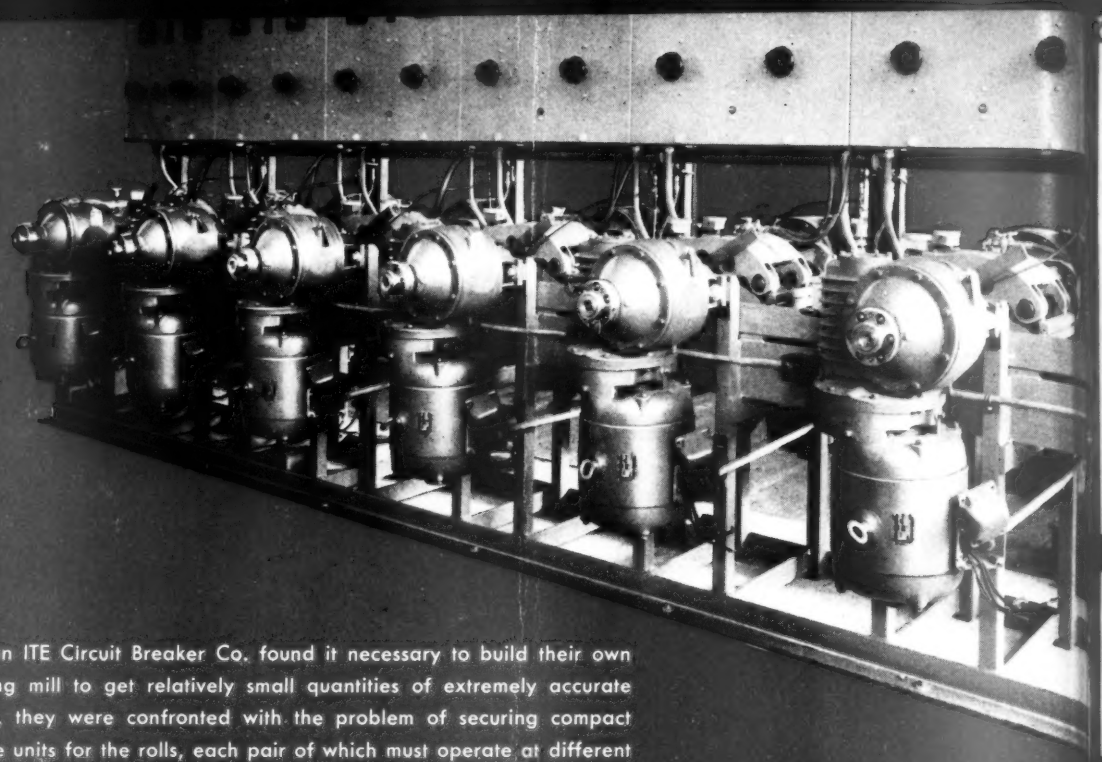

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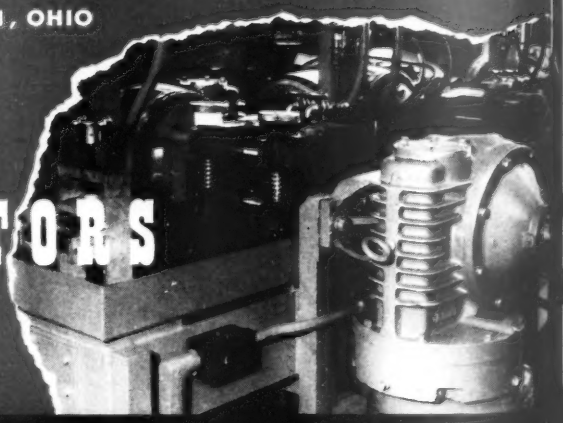

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